# Ref: T-8, page 6, lines 20-22 (Transmission Oper Exp).

The referenced testimony indicates that a \$162,000 expense difference between 2003 and 2005 "primarily results from staff additions to provide required operational coverage and inspections of transmission facilities to maintain system reliability." Please provide the following:

- a. Was HECO not required, or was it unnecessary for the Company to provide "operational coverage and inspections of transmission facilities to maintain system reliability" in 2003? Please explain.
- b. Referring to the response to part (a) above, please identify any new requirements imposed on HECO in 2004 or 2005 that did not exist in 2003, indicating the date of implementation and the source of each new requirement.

#### **HECO Response:**

a. As noted in our testimony, HECO T-8, page 6, transmission operation expense includes labor and non-labor costs to support activities such as load dispatching, transmission switching operations, transmission substation inspections and operations, communications systems inspections and operations and transmission line, pole, and structure inspections.

(Please refer to HECO-809 for a breakdown of transmission operation labor and non-labor costs.) These functions are needed on an ongoing basis to ensure system reliability, and HECO was able to provide operational coverage in 2003 by prioritizing work, working extended shifts and increasing overtime.

As mentioned in HECO T-1, page 19, although HECO was able to manage our spending and staffing, this cannot continue for an indefinite period of time while maintaining the reliability of the system. In order to ensure consistent, reliable service, HECO must slowly resume optimal staffing levels to ensure a certain level of operational coverage.

Due to the constraints placed on spending and staffing, a backlog of work was

created. In the C&M Department, a backlog of preventive inspections was created. The backlog of preventive inspections was primarily addressed in 2004, but for the 2005 test year, an increase in inspection is forecasted primarily due to our aging facilities and subsequent need for early identification of problems.

In the System Operation Department, the backlog of work in the Operating Engineering Division consisted of the maintenance and updating of system maps, circuit drawings and switching diagrams. Also, there was an impact on the monitoring of discrepancies and field inspections to verify changes being made to maps and/or drawings. With the filling of vacancies and through contract services, some of this backlog was addressed in 2004. In the Instrument and Control Division, most of the deferred work with respect to meter calibrations and regulator maintenance was completed with the filling of vacancies in 2004.

b. There were no new requirements imposed on HECO in 2004 or 2005. Operational needs will continue to be prioritized and addressed, as resources become available, within a reasonable period of time. In the event required work arises, it will be handled in a timely manner. One example of this is the Vegetation Management requirements that arose during 2004. Although a budgeted amount was originally allocated to the program, due to additional rainfall and increased growth of vegetation, the actual amount spent exceeded the budget.

# Ref: T-8, page 7, lines 23-25 (Transmission Maint Exp).

The referenced testimony indicates that a \$936,000 expense difference between 2003 and 2005 "primarily results from staff additions to provide required operational coverage and inspections, and increased security of transmission facilities to maintain system reliability." Please provide the following:

- a. Was HECO not required, or was it unnecessary for the Company to provide comparable "operational coverage and inspections, and increased security . . . to maintain system reliability" in 2003? Please explain.
- b. Referring to the response to part (a) above, please identify any new requirements imposed on HECO in 2004 or 2005 that did not exist in 2003, indicating the date of implementation and the source of each new requirement.

#### **HECO Response:**

a. As noted in our testimony, HECO T-8, page 7, transmission maintenance expense includes labor and non-labor costs to support activities such as maintenance and repairs related to transmission substation equipment and facilities, communications equipment, transmission lines and cables and tree trimming. (Please refer to HECO-809 for a breakdown of transmission maintenance labor and non-labor costs.) These functions are needed on an ongoing basis to maintain system reliability, and HECO was able to provide adequate maintenance coverage in 2003 by prioritizing work, working extended shifts, increasing overtime and through the use of contract services.

As mentioned in HECO T-1, page 19, although HECO was able to manage our spending and staffing, this cannot continue for an indefinite period of time while maintaining the reliability of the system. In order to ensure consistent, reliable service, HECO must slowly resume optimal staffing levels to ensure a certain level of operational coverage.

Due to the constraints placed on spending and staffing, a backlog of work was created. In the System Operation Department, due to a lack of staffing in the Instrument and Control and Substation Divisions, baseline maintenance was required to be modified as work was handled on a reactive versus proactive basis. In addition, there was a greater lag in the timeliness of equipment upgrades and less repair work on fault detection equipment. Work will continue to be prioritized and addressed within a reasonable period of time without affecting reliability as vacancies can be filled.

b. There were no new requirements imposed on HECO in 2004 or 2005. Maintenance needs will continue to be prioritized and addressed, as resources become available, within a reasonable period of time. In the event required work arises, it will be handled in a timely manner. One example of this is the Vegetation Management requirements that arose during 2004. Although a budgeted amount was originally allocated to the program, due to additional rainfall and increased growth of vegetation, the actual amount spent exceeded the budget.

	Ref: T-8, pages 9-10 (Distribution O&M Exp).
	The referenced testimony indicates that \$848,000 of distribution operations expense and \$2,065,000 of distribution maintenance expense of the difference between 2003 and 2005 is due
	*
	to "staff additions" required to operate and/or maintain distribution facilities" and maintain or ensure system reliability. Please provide the following:
	a. Was HECO not required, or was it unnecessary for the Company to provide adequate staffing to inspect and maintain its distribution facilities and maintain system reliability in 2003? Please explain.
<u> </u>	
· -	
	<b>1)</b>
	<b>4</b>
-	

HECO must slowly resume optimal staffing levels to ensure a certain level of operational coverage.

In the C&M Department, there was a backlog of work created due to the limited staffing in the addressing of overhead jumpers, which are installed to temporarily restore power to customers with underground services, and preventive inspections was created. The backlog of overhead jumpers and preventive inspections were addressed in 2004, through the use of both capital and O&M dollars. For the 2005 test year, an increase in preventive inspections is forecasted primarily due to our aging facilities and subsequent need for early identification of problems.

In the System Operation Department, one area affected by the reduced staffing was the Operating Engineering Division. The backlog created in this Division consisted of the maintenance and updating of system maps, circuit drawings and switching diagrams. Also, due to a lack of personnel, there was an impact on the monitoring of discrepancies and field inspections to verify changes being made to maps and/or drawings. In the Instrument and Control Division, some of the work that was deferred was meter calibrations, a greater lag in the timeliness of equipment upgrades and less repair work on fault detection equipment and baseline maintenance was required to be modified as work was handled on a reactive versus proactive basis. The work contracted to fill the void created by reduced employee levels was primarily capital in nature. This work consisted of the installation of equipment in new Substations.

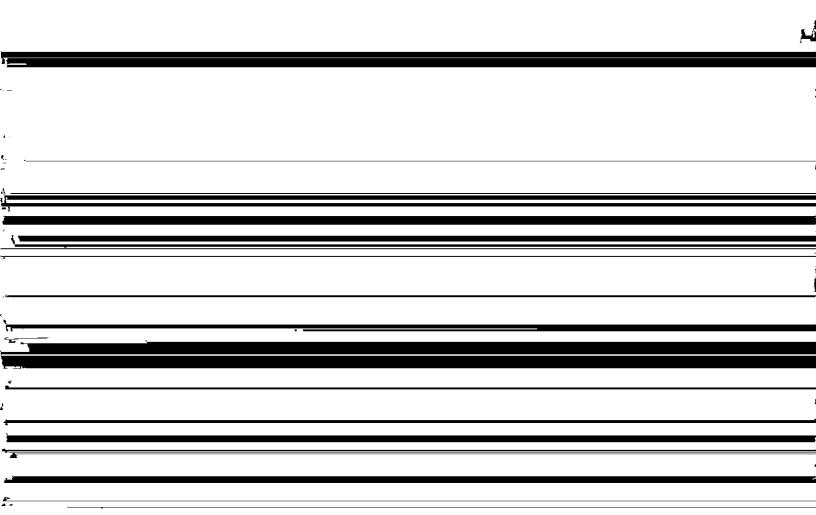
The 2005 test year estimate represents the normal on-going expenses needed to provide reliable service over a reasonable period of time. In the upcoming years work will continue to be prioritized and addressed within a reasonable period of time, as resources

become available. In the event that unforecasted work arises throughout the year, the work will be addressed as deemed necessary. An example of this occurred during 2004; as due to excessive rainfall additional funds were spent in the Vegetation Management program to address the increased growth of vegetation around HECO's facilities.

b. There were no new requirements imposed on HECO in 2004 or 2005. Maintenance needs will continue to be prioritized and addressed, as resources become available, within a reasonable period of time. In the event required work arises, it will be handled in a timely manner. One example of this is the Vegetation Management requirements that arose during 2004. Although a budgeted amount was originally allocated to the program, due to additional rainfall and increased growth of vegetation, the actual amount spent exceeded the budget.

# Ref: T-8, pages 10-11 (T&D O&M).

The referenced testimony indicates that the 2005 test year estimate of T&D O&M expenses are based on HECO's O&M Expense Budget for the year with contain adjustments. Plants and its



HECO's T&D expense budget for calendar years 2003 and 2004, in a summary format comparable to HECO-809.

# **HECO Response:**

The Company objects to providing forecast information for the years prior to 2004 based on a previous agreement with the Consumer Advocate to provide forecast information for the test year and link year (2004) only. However, without waiving it objections, and in the interest of compromise, the Company is providing the forecast information for the years requested. Please refer to pages 2 and 3 to this response for the 2003 and 2004 T&D expense budget respectively.

# Hawaiian Electric Company, Inc. 2003 Forecast

# TRANSMISSION AND DISTRIBUTION <u>OPERATION AND MAINTENANCE EXPENSE</u> (\$ Thousands)

			PERATING ORECAST
	Transmission Operations		
1	Labor	\$	1,585
2	Non-Labor	\$	1,415
3	TOTAL	\$	3,000
	Transmission Maintenanc	<u>e</u>	
4	Labor	\$	1,899
5	Non-Labor	\$	2,220
6	TOTAL	\$	4,119
7=3+6	TOTAL TRANS O&M	\$	7,119
	Distribution Operations		
8	Labor	\$	4,792
9	Non-Labor	\$	3,403
10	TOTAL	\$	8,195
	Distribution Maintenance		
11	Labor	\$	4,621
12	Non-Labor	\$	5,890
13	TOTAL	\$	10,511
14=10+13	TOTAL DIST O&M	\$	18,706
15=7+14	GRAND TOTAL O&M	\$	25,825

#### Note:

Figures may not total exactly due to rounding.

# Hawaiian Electric Company, Inc. 2004 Forecast

# TRANSMISSION AND DISTRIBUTION <u>OPERATION AND MAINTENANCE EXPENSE</u> (\$ Thousands)

			PERATING ORECAST
	Transmission Operations		
1	Labor	\$	1,543
2	Non-Labor	\$	1,357
3	TOTAL	\$	2,900
	Transmission Maintenance	e	
4	Labor	\$	1,940
5	Non-Labor	\$	2,279
6	TOTAL	\$	4,219
7=3+6	TOTAL TRANS O&M	\$	7,119
	Distribution Operations		
8	Labor	\$	4,278
9	Non-Labor	\$	3,756
10	TOTAL	\$	8,034
	<u>Distribution Maintenance</u>		
11	Labor	\$	4,739
12	Non-Labor	\$	5,790
13	TOTAL	\$	10,529
14=10+13	TOTAL DIST O&M	\$	18,563
15=7+14	GRAND TOTAL O&M	\$	25,682

Note:

Figures may not total exactly due to rounding.

## Ref: T-8, page 12, lines 12-17 (T&D O&M Increases).

The referenced testimony lists six items contributing to the expected increase in T&D O&M for the 2005 test year. Please provide an estimate of the increase in O&M expense associated with <u>each</u> item.

#### **HECO Response:**

Increases in Wages and Non-labor Rates (Item 1) — Weighted-average wage and salary increases for bargaining unit employees (5.29%) and merit employees (7.11%) from 2003 to 2005 are shown in HECO-1305. The amount of the increase in labor costs from 2003 to 2005 due to increasing wage and salary levels can be roughly calculated as follows:

BU Forecast (\$) – [BU Forecast (\$) / 1.0529] = Increase in BU \$10,361,516 – \$9,840,931 = \$520,585 Merit Forecast (\$) – [Merit Forecast (\$) / 1.0711] = Increase in Merit \$2,991,614 - \$2,793,030 = \$198,584

T&D Plant Aging, Growth in the T&D Utility Plant (Items 2 and 3) – The increase in maintenance to address the aging and growing T&D utility plant is primarily capital in nature, and is reflected in the increase in our preventive programs. Please see Attachment A for more detailed descriptions of the programs and the actual costs from 2000 - 2004, including both capital and O&M, and the 2005 test year estimate.

# System Reliability Initiatives, Major Reliability Initiatives (Items 4 and 5):

Cable Faults – Cable faults continue to be a leading cause of power outages. The work that
will be done to address cable faults will be primarily capital in nature, as reflected in
program P0000122 and P1810000. Please refer to Attachment A for further details of the
programs and the actual costs for 2000 – 2004, 2004 budget and 2005 test year estimate.

For more information on our direct buried cable replacement programs, please refer to our response to CA-IR-57.

Plant Maintenance Optimization – A major reliability initiative that we will be undertaking
will be the implementation of Maintenance Optimization. Due to our aging facilities,
Maintenance Optimization will help to manage the rate of increase of expenses in
subsequent years. Please refer to our response to CA-IR-56 for additional discussion on the
Maintenance Optimization program.

Staffing Increases (Item 6): There is some overlap between the calculated impacts of increasing wage and salary rates, and adding O&M employees, since the calculated impact of adding employees includes the effect of paying them at wage rates and salary levels applicable to 2005.

- For the System Operation Department, the additional staffing is listed in CA-IR-1, HECO T-8, Attachment K, Item d, pages 2 and 3. The estimated increase in O&M expenses due to these positions is approximately \$2,000,000.
- For the C&M Department, except for the Primary Troublemen (PTM), the staffing increases do not have a direct impact on O&M expenses as the forecast is based on work Demand and not staffing levels. Please refer to our response to CA-IR-70c. For the PTM's, the 2005 test year estimate includes staffing for 21 fully qualified PTM's, 1 Senior PTM and 4 PTM's in training. Please see our response to CA-IR-68 for a discussion on PTM staffing. The estimated increase in O&M expenses due to the 5 additional PTM's is approximately \$850,000.

# Description of C&M Programs

The purpose of the following programs is to maintain or improve system reliability, power quality and customer satisfaction by restoring service or the system to its prior or an upgraded condition.

**P0000120** – Corrective overhead transformer replacement program. The purpose of the program is the repair or replacement of overhead transformers that have been identified as failed due to being rusted, leaking, overloaded or damaged by an outside party.

**P0000121 – Corrective underground transformer replacement program.** The purpose of the program is the repair or replacement of underground padmount transformers that have been identified as failed due to being rusted, leaking, overloaded or damaged by an outside party.

**P0000122 – Corrective miscellaneous cable failures.** The purpose of the program is the corrective repair or replacement of underground primary, secondary, service and transmission cables, including damages due to a dig-in by outside parties. The replacement cable may be of greater capacity and/or higher voltage rating to accommodate future conditions. See response at CA-IR-57.

**P0000123** – Corrective overhead distribution replacements. The purpose of the program is the repair or replacement of overhead distribution poles and associated equipment, including cutouts, aerial cables, conductors and fixtures that have been identified as broken, rusted, corroded, rotten or damaged. This is to restore service or the system to its original condition or an upgraded condition.

P0000124 – Corrective overhead subtransmission replacements. The purpose of the program is the repair or replacement of overhead subtransmission poles and associated equipment, including anchors, conductors and fixtures that have been identified as broken, rusted, corroded, rotten or damaged. This is to restore service or the system to its original condition or an upgraded condition.

**P0000125** – Corrective overhead transmission replacements. The purpose of the program is the repair or replacement of overhead transmission poles and associated equipment, including anchors, conductors and fixtures that have been identified as broken, rusted, corroded, rotten or damaged. This is to restore service or the system to its original condition or an upgraded condition.

**P0000126 – Vegetation management.** This program is to manage vegetation along HECO roadside, right-of-way and other facilities to ensure safe and reliable service can be provided. This includes cutting, trimming and controlling trees, vines and other

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# Description of C&M Programs

undesirable vegetation to ensure easy and safe access for inspections, maintenance and repairs of facilities.

**P0000127 – Test and treat wood poles.** This program involves the inspection of wood poles by sounding and boring to determine the condition of the poles and then treatment of the poles with insecticide or fungicide. The program will identify and correct any potential damage by termites or wood rot, which will prolong the life of the pole and reduce replacement costs and outages caused by pole failures.

P0000359 - Corrective maintenance of T&D system. The program is to make minor miscellaneous temporary or permanent repairs or adjustments to unsafe equipment that has failed and poses a danger to customers.

**P0000360 – Preventive maintenance of T&D system.** The program is to make minor miscellaneous planned repairs, replacements or improvements of overhead and underground equipment that has been identified as deteriorated or damage and not up to standard.

P0000361 – Preventive inspection of T&D system. The purpose of the program is the overhead and underground inspections of the transmission and distribution system to identify potential repairs, replacements or improvements of equipment. This program should identify deteriorated and/or broken equipment before it fails and leads to outages.

P0000362 - Corrective inspection of T&D system. The purpose of the program is the corrective inspection to determine the cause of interruptions or outages to improve system reliability and power quality.

**P0000740 – PTM switching operations.** This program is being created to capture PTM responsibilities not related to a specific program or project, including emergency or accident investigations, minor repairs and trouble calls.

P1789000 – Preventive overhead transformer replacement. The purpose of the program is the planned repairs or replacement of overhead transformers that have been identified due to rusting, potential future overloading conditions or as part of a planned pole replacement/upgrade.

P1793000 – Preventive underground transformer replacement. The purpose of the program is the planned repairs or replacement of underground padmount transformers that have been identified due to rusting, potential future overloading conditions or as part of a planned pole replacement/upgrade.

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# Description of C&M Programs

P181000 – Preventive miscellaneous cable failure replacement. The purpose of the program is the planned replacement of underground cables that have been identified as needing replacement due to excessive faulting. See response to CA-IR-57.

P3400000 – Preventive overhead distribution replacements. The purpose of the program is the repair or replacement of overhead distribution poles and associated equipment, including cutouts, aerial cables, conductors and fixtures prior to failure.

**P3401000 – Preventive overhead subtransmission replacements.** The purpose of the program is the repair or replacement of overhead subtransmission poles and associated equipment, including anchors, conductors and fixtures prior to failure.

P3402000 – Preventive overhead transmission replacements. The purpose of the program is the repair or replacement of overhead transmission poles and associated equipment, including anchors, conductors and fixtures prior to failure.

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2004 vs 2005 (181,749) (18,370)	(307,521)	(8,373,064) 13,290	(2,386,349)	151,282	, ,	(1,698,152)	2,824	(201,466)	90,213	578,185	(281,153)	1,088,570	(182,713)	446,843 90,430	618,646 (18,182)	1,353,387	905,729 447,763	996,349 78,304	867,023 (114,018)	(5,954,687)	(6,092,137) 137,450
2003 vs <u>2005</u> (79,860) 40,371	(283,785)	(2,057,890) 166,519	(1,554,922)	(341,892)		(127,239)	(150,733)	(296,084)	143,050	321,723	315,690	1,761,364	(1,380,002)	434,260	434,140	2,313,032 (264,827)	1,545,722	981,645 61,635	273,641 (87,552)	3,062,654	284,089 2,778,565
2005 Bud 273,875 169,050	208,144	898,118 270,696	686,686 515,966	417,947	, , ,	2,349,159	729	2,088,474	347,907	695,685	1,849,125	3,069,216		549,758 122,020	774,661 81,222	3,128,792 99,454	1,350,660 980,670	1,933,579 231,390	1,377,500 56,490	24,876,622	11,599,720 13,276,902
2004 Act 455,624 187,420	515,665 135,579	9,271,182	3,073,035 627,447	266,665 110,388	1 1	4,047,311	(2,095)	2,289,940	257,694	117,500	2,130,278	1,980,646	182,713	102,915 31,590	156,015 99,404	1,775,405 12,443	444,931 532,907	937,230 153,086	510,477 170,508	30,831,309	17,691,857 13,139,452
2004 Bud 299,789 161,619	192,852 227,632	916,297 821,503	677,432 491,945	383,774 122,853	ı	2,675,112	698	1,865,292	167,476 344,709	495,295	1,313,983	2,898,242	,	534,199 119,246	751,032 87,791	4,090,533 96,668	1,148,493	1,863,125 221,422	1,416,706 54,056	24,809,797	12,441,708 12,368,089
2003 Act 353,735 128,679	491,929 96,501	2,956,008 104,177	2,241,608	759,839 120,400	\$ 1	2,476,398	151,462	2,384,558	204,857	373,962	1,533,435	1,307,852	1,380,002	115,498 44,908	340,521 70,629	815,760 364,281	(195,062) 490,672	951,934 169,755	1,103,859	21,813,968	11,315,631 10,498,337
2002 Act 330,159 190,551	277,083 174,099	1,360,432 18,183	1,332,337 281,482	387,604 55,371	2,212 522	4,421,216	10,231	1,809,762	194,321	757,944	1,294,526	,	1,284,840	222,636 100,395	159,598 84,784	1,682,397 174,195	333,571 1,031,761	2,142,584 444,654	109,019 6,535	20,675,004	9,624,472 11,050,532
2001 Act 322,529 76,971	232,553 91,199	693,822 72,536	1,107,478 267,089	228,169 43,219		3,467,095	5,310	1,721,057	77,950	778,021	1,142,647		1,298,904	284,146 126,012	319,561 183,359	1,241,216 145,885	4,689,034 1,144,463	2,646,469 362,293	58,402 3,974	22,831,363	13,122,283 9,709,080
2000 Act 152,196 44,286	97,661 28,416	148,220 58,643	643,922 139,807	250,996 51,329		•	•	1,866,394	395,036	•	•		94,325	221,460 117,808	192,418 78,571	2,562,200	4,388,876	2,514,408 363,252	523,054 42,553	16,307,564	11,789,736 4,517,828
Acct Group <u>Descrip</u> Capital O&M	Capital O&M	Capital O&M	Capital O&M	Capital O&M	Capital O&M	O&M	O&M	O&M	Capital O&M	O&M	O&M	O&M	Capital	Capital O&M	Capital O&M	Capital O&M	Capital O&M	Capital O&M	Capital O&M	TOTAL	Capital O&M
lect Rpl	Rpl	Прр	<u>a</u>	<u>ig</u>	Ярі	itenance	>ction	agement	bod Poles	itenance	action	Operations	Dist Cable	ransf Repl	ransf Repl	ЯрІ	To.	is Repl	Jde)		

# Ref: HECO-807, HECO-810 & HECO-812 (T&D Expense).

Please update these exhibits to include the actual amounts recorded in 2004.

# HECO Response:

Please refer to attachments HECO-807 (revised), HECO-810 (revised) and HECO-812 (revised) for details.

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HECO-807 (revised)

Hawaiian Electric Company, Inc. 2005 Test Year

TRANSMISSION & DISTRIBUTION O&M EXPENSE (\$ Thousands)

			RECORDED	ED		TEST YEAR ESTIMATE	2004 vs 2005	2005
	(A)	(B)	(C)	(D)	(E)	(F)	(G=F-E) (H=G/E)	H=G/E)
	<u>2000</u>	2001	2002	2003	2004	2005	∽l	%
1 Transmission O&M	\$7,054	\$6,885	\$6,699	\$6,989	\$8,107	\$8,087	(\$20)	(0)
2 Distribution O&M	\$22,221	\$20,484	\$19,626	\$17,219	\$21,001	\$20,132	(\$869)	(4)
3 Total	\$29,275	\$29,275 \$27,369 \$26,324 \$24,208	\$26,324	\$24,208	\$29,108	\$28,219	(\$886)	(3)
4 Increases / (Decrease)		(7%)	(4%)	(%8)	20%	(3%)		

Note:\_\_\_\_\_\_Figures may not total exactly due to rounding.

Hawaiian Electric Company, Inc. 2005 TEST YEAR

TRANSMISSION O&M EXPENSE (\$ Thousands)

				RECORDED	ED		TEST YEAR ESTIMATE	20	2004 vs 2005	005
		(A) 2000	(B) 2001	(C) 2002	(D) 2003	(E) 2004	(F) 2005	(G=F	(G=F-E) (H=G/E)	[=G/E)
	Operations	\$3,023	\$3,421	\$2,809	\$3,275	\$3,533	\$3,437	<b>↔</b>	(96)	(3)
	Maintenance	\$4,031	\$3,464	\$3,890	\$3,714	\$4,574	\$4,650	€	92	2
_	Total	\$7,054 \$6,885	\$6,885	\$6,699	\$6,989	\$8,107	\$8,087	\$	(20)	0

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HECO-810 (revised)

Note:\_\_\_\_Figures may not total exactly due to rounding.

Hawaiian Electric Company, Inc. 2005 TEST YEAR

**DISTRIBUTION O&M EXPENSE** (\$ Thousands)

				RECORDED	ED		TEST YEAR ESTIMATE	2004 vs 2005	<u>305</u>
	-	(A) 2000	(B) 2001	(C) 2002	(D) 2003	(E) 2004	(F) 2005	(G=F-E) (H=G/E)	=G/E)
	Operations	\$8,100	\$8,049	82,669	\$7,802	\$8,404	\$8,650	\$246	ю
7	Maintenance	\$14,121 \$12,435	\$12,435	\$11,957	\$9,417	\$12,597	\$11,482	(\$1,115)	(6)
8	Total	\$22,221	\$22,221 \$20,484 \$19,626 \$17,219	\$19,626	\$17,219	\$21,001	\$20,132	(698\$)	(4)

CA-IR-65 DOCKET NO. 04-0113 PAGE 4 OF 4

HECO-812 (revised)

Note: Figures may not total exactly due to rounding.

#### Ref: HECO-WP-805 (T&D Expense).

Notes D, K and O refer to "misunderstandings" that led to actual expenses being charged to expense element 505, representing Outside Services – Construction, rather than element 501. Please provide the following:

- a. When and how did this "misunderstanding" first arise?
- b. Please explain how this "misunderstanding" impacted the actual T&D O&M expenses recorded during the period 2000-2004.
- c. Please explain when and how the actual charges were corrected.
- d. Please explain whether the charges to "Outside Service Construction" were capitalized, as implied by the name, or expensed.
- e. Referring to the response to part (c) above, did the correcting journal entries in the identified periods included any amounts attributed to one or more prior years? Please explain.

## **HECO Response:**

- the "misunderstanding" was identified in 2004 during our review of O&M expenses. Once the item was identified, clarification and resolution was received soon thereafter. The "misunderstanding" arose primarily due to varying interpretations of when expense element 501 Outside Services-General, and 505 Outside Services-Construction should be utilized. The 2005 test year forecast was created using expense element 501, as the work being performed did not involve the construction/repair of any facilities. The contract with the Vegetation Management and Test & Treat contractors, which directs the actual costs, was established using expense element 505. The Contract Administrator, who is responsible for creating the contract, used expense element 505 for work performed in the operational environment and expense element 501 for work performed that was administrative in nature.
- b. There is no impact on the actual 2000-2004 T&D O&M expenses, as both expense elements

can be charged to O&M expenses. The expense element is primarily used for internal segregation of outside service costs, whereas, the primary driver for determining the allocation of costs to Capital vs. O&M is the indicator portion of the code block (i.e., NI [Capital], NE [O&M], etc.).

- c. As there was no impact to the financial statements, no correcting journal entries were made to transfer actual costs from expense element 505 to 501. Contracts for Vegetation Management and Test & Treat are now being created in ELLIPSE using expense element 501.
- d. These charges to "Outside Service-Construction" were not capitalized. See further discussion in response to part b. above regarding the classification of costs to Capital vs. O&M.
- e. See response to part c. above.

# Ref: HECO-WP-805 (Distribution Expense).

Notes L, M, N, P and Q refer to certain expense variances as being due to "preventive" or "corrective" distribution maintenance. Please provide the following:

- a. For each "Note," please describe the specific "preventive" or "corrective" maintenance planned for 2005 that was not undertaken in 2003.
- b. Referring to response to part (a) above, please explain whether similar "preventive" or "corrective" maintenance was undertaken prior to 2003.
- c. Referring to response to part (a) above, please explain why similar "preventive" or "corrective" maintenance was not undertaken during 2003.
- d. Referring to response to part (a) above, does the "preventive" or "corrective" maintenance planned for 2005 include any "catch-up" maintenance amounts attributed to one or more prior years? Please explain.

# **HECO Response:**

a. Preventive and corrective maintenance are on-going activities. Notes L, M, N and P refer to the labor expenses for the programs described below. Expenses were incurred in each year (2001-2004) shown. The current spent for each program from year to year may vary. As a result, some of the expense levels are expected to be higher in 2005 than 2003, and some are expected to be lower. See response to CA-IR-64, page 4, for total project expenses.

Note L refers to labor costs for the preventive maintenance of distribution overhead facilities and forecasted in Program P3400000. In general, this program covers planned work required to make repairs or replace distribution overhead facilities and/or equipment associated with these facilities. In 2005, we are forecasting an increased labor demand in Program P3400000, to address the aging of our distribution wood pole facilities.

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2001 - \$658,000

2002 - \$518,600

2003 - \$202,600

2004 - \$145,600

Note M refers to labor costs related to corrective maintenance of distribution overhead work and forecasted in Program P0000123. In general, this program covers work required to repair or replace overhead distribution poles and associated equipment that has been identified as broken or damaged. In 2005, we are forecasting an increase in the program, over 2003, and an increase in the 2005 test year forecast reflects estimate of corrective work that will be identified through the increased inspections that are being performed to address the aging T&D system.

2001 - \$150,000

2002 - \$158,400

2003 - \$142,300

2004 - \$286,700

Note N refers to labor costs related to corrective maintenance of distribution overhead work and included in Program P0000359. In general, this program covers work to make repairs of faulty equipment to restore it to its normal operating condition. In 2005 we are forecasting a decrease, over 2003, in this type of work based on prior years actual spending:

2001 - \$428,500

2002 - \$369,800

2003 - \$262,700

2004 - \$431,100

Note P refers to labor costs related to corrective maintenance of distribution underground work and forecasted in Program P0000359. In general this program covers work necessary to make repairs of faulty equipment to restore it to its normal operation condition. This program includes installing temporary overhead "jumpers", fault finding of underground cables and the required repairs to restore service to the customer. In 2005 we are forecasting a decrease, over 2003, in this type of work based on prior year actual spending in this program and the increased focus on addressing direct buried cables, see CA-IR-57 for further discussion:

2001 - \$867,400

2002 - \$1,098,000

2003 - \$585,600

2004 - \$1,107,000

Note Q refers to Outside Services costs related to corrective maintenance of distribution underground work and forecasted in Program P0000359. In general, this program covers work to make repairs of faulty equipment to restore it to its normal operating condition. This work associated with the costs noted above primarily represents the use of outside contractors to expose underground cables and the subsequent repair of the area, including repaving of roads, restoring sidewalk, landscaping, etc. In 2005 we are forecasting an increase, over 2003, in this type of work:

2001 - \$257,100

2002 - \$432,000

2003 - \$208,000

2004 - \$375,500

Note that in HECO WP-805 Note Q, 4<sup>th</sup> line down, should read \$208,002 instead of \$584,114.

b. The preventive and corrective maintenance work noted above was being performed prior to

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2003.	The increases	requested w	vill allow	us to 1	perform	more of	this v	work in	2005.

c. The increases in Notes L, M and P provide for an increase level of work in the programs

d. "Catch up" costs were not specifically included in program estimates for 2005. Please refer
 to our response to CA-IR-59 part d.

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HECO Response:

Ref:	HEC	<b>O-V</b>	VP-8	805 (	Distri	bution	Expe	ase).

	ind	tes F and H refer to an increase in staffing to "ensure adequate coverage of 24/7 shifts," licating that current staffing results in difficulties with staffing shifts and/or causes PTM's to
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	a.	Please explain the "PTM" acronym.
	b.	Prior to 2003, did HECO have adequate staffing to fully cover 24/7 shifts? Please explain.
	c.	In the absence of adequate staffing, did the extended shifts result in HECO paying additional overtime or premium pay to employees? Please explain.
	d.	In preparing the 2005 test year forecast, was T&D expense determined in such a manner that excluded any overtime or premium pay that would have been incurred absent the increase in staffing?
		1. If so, please explain how that was achieved.
		2. Provide documentation demonstrating said exclusion or a pinpoint reference to the T&D workpapers already provided that shows such exclusion.

a. "PTM" is an acronym that stands for Primary Troubleman. Their roles include:

training, 21 fully-qualified PTM's and 4 PTM's in training.

As of 1/31/05, there are 1 Senior PTM, 18 fully-qualified PTM's and 1 PTM in training. Out of the 18 fully-qualified PTM's, 7 have completed their training program within the last 2 years. In addition, there are 2 PTM's that are currently eligible for full retirement and 6 that are eligible for early retirement. As it takes 1 to 4 years to acquire the minimum amount of skills required to perform the duties in an efficient and safe manner, additional PTM's are required to begin training to account for the projected loss of experience and knowledge and to ensure adequate coverage of the 24/7 shifts.

- c. Due to the staffing levels, extended shifts were required of the PTM's, which resulted in employees working overtime to ensure coverage of the 24/7 shifts. The overtime rate for PTM's from 2000 2004 was 19.4%, 22.4%, 18.9%, 23.4% and 29.4%, respectively. These are total overtime rates, a portion of which was due to staffing levels.
- d. The 2005 test year forecast was calculated using standard labor rates. These standard labor rates are calculated taking into account overtime hours and dollars, and then adjusted to reflect any general pay increases expected during the year. Please refer to Mr. Shiraki's testimony at HECO T-13, page 13 and 14, for additional details on the calculation of the

standard labor rate.

# Ref: T-8, pages 7 & 9 (T&D Tree Trimming).

Please provide the actual tree/brush trimming expense, by NARUC account, for calendar years 2000-2004 and the 2005 test year forecast. If the information is contained in the exhibits or workpapers previously provided by HECO, please provide a pinpoint reference to the responsive data.

# **HECO Response:**

The following chart documents NARUC account and the actual tree/brush trimming expenses for 2000 - 2004 and the 2005 test year forecast.

NARUC	NARUC Description	2000 Actual	2001 Actual	2002 Actual	2003 Actual	2004 Actual	2005 Test Year Forecast
571	MAINT OH LINES-TRANS	730,941	493,836	512,382	504,541	598,698	682.003
593	MAINT OH LINES-DIST	1,542,797	1,544,897	1,335,908	1,895,205	1,700,985	1,543,866
		2,273,738	2,038,733	1,848,290	2,399,746	2,299,683	2,225,869

# Ref: T-8, pages 18-20 & HECO-825 (Staffing).

At page 19, the referenced testimony discusses the efforts undertaken to strategically manage the staffing reductions during 2000-2003, including: productivity improvements, reorganization, use of contract services, use of smaller construction crews, and use of new technologies. HECO-825 shows that the 2005 test year staffing levels will exceed even the 2000 level. Please provide the following:

- a. Does HECO's 2005 test year forecast anticipate continuing with these productivity and efficiency efforts? If not, please explain why those efforts should be terminated.
- b. During this period, did HECO incur incremental employee overtime costs or increased costs for contract services to fill the void created by reduced employee levels? Please explain and provide supporting quantification data.
- c. Referring to the response to parts (a) and (b) above, does the 2005 test year forecast recognize reduced overtime pay and lower contract work as a result of the higher staffing forecast?
  - 1. If not, explain why not.
  - 2. If yes, please explain how the reduction in costs was recognized in the forecast and provide a pinpoint reference to any workpapers showing this result.

## HECO Response:

- a. Yes, HECO's 2005 test year forecast anticipates continuing productivity and efficiency improvements. These productivity and efficiency improvements, partnered with the increased staffing, will help to manage the rate of increase of expenses caused by HECO's aging facilities.
- b. As a normal business practice, HECO incurs overtime costs. The following is a list of some instances where overtime is incurred:
  - Responding to emergencies and outages outside of the normal business hours
  - To meet customer schedules
  - To perform planned work outside of normal business hours where an outage to a

## commercial customer is required

The two Departments primarily responsible for performing transmission and distribution construction work are Construction & Maintenance (C&M) and System Operation. In C&M, the overtime rate from 2000 – 2004 was 16.7%, 17.4%, 14.2%, 17.5% and 26.7%, respectively. In System Operation, the overtime rate from 2000 – 2004 was 7.2%, 5.3%, 6.6%, 6.8% and 9.0%, respectively.

In the C&M Department, there was a backlog of work created due to the limited staffing in the addressing of overhead jumpers, which are installed to temporarily restore power to customers with underground services, and preventive inspections was created. The backlog of overhead jumpers and preventive inspections were addressed in 2004, through the use of both capital and O&M dollars. For the 2005 test year, an increase in preventive inspections is forecasted primarily due to our aging facilities and subsequent need for early identification of problems. Please refer to CA-IR-64 Attachment A, program P0000361 – Preventive inspections, for a comparison of 2004 actual costs versus 2004 budget costs.

In the System Operation Department, one area affected by the reduced staffing was the Operating Engineering Division. The backlog created in this Division consisted of the maintenance and undating of system mans circuit drawings and switching diagrams. Also

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was primarily capital in nature. This work consisted of the installation of equipment in new Substations. During this period, System Operation also contracted the following amounts of O&M and capital dollars for the years 2000 - 2003, approximately \$22,000, \$0, \$60,000 and \$93,000 for O&M, respectively, and approximately \$465,000, \$676,000, 384,000 and \$490,000 for capital, respectively.

The 2005 test year forecast represents the normal on-going expenses needed to

Ref: T-8. HECO-825 & HECO-WP-811 (Staffin	σ).
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			004 VS 2005	F-E) (H=G/E)	7 3	4 15	1 7	CA-IR-71 DOCKET NO. 04-0113 PAGE 2 OF 5 HECO-825 (revised)
·	1 <sub>10</sub>							
•			اد. ~			1	II	
			TEST YEAR ESTIMATE	(F) 2005	220	109	329	
				(E) 2004	213	95	308	
	Hawaiian Electric Company, Inc. 2005 Test Year	AVERAGE STAFFING LEVELS		(D) <u>2003</u>	204	95	299	
t	ian Electric Comp 2005 Test Year	AGE STAFFI	RECORDED	(C) 2002	207	103	310	
	Hawaii AVERA	AVER	junimal :	(B) 2001	214	105	319	
			(A) 2000	220	103	323		
					1 & Maintenance	ration		

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# HECO-WP-811 (revised)

# Hawaiian Electric Company, Inc. Summary--Average Employees

		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H) Test Yr	(I)	(J)
		Recorded				Variance		Est	Vari	Variance	
	Organization	2000	<u>2001</u>	<u>2002</u>	<u>2003</u>	2004 *	<u></u>	%	2005	<u>\$</u>	<u>%</u>
	VP-Corporate Excellence										
1	Compensation & Benefits	14	14	13	13	14	1	8	14	0	0
2	Industrial Relations	8	9	9	9	9	0	0	9	0	0
3	Safety, Security & Facilities	43	41	40	41	42	1	2	43	1	2
4	Workforce Staffing & Development	16	16	16	15	16	1	7	16	0	0
5	VP-Corporate Excellence's Office	2	2	2	2	2	0	0	2	0	0
6	Subtotal	83	82	80	80	82	2	3	84	2	2
	VP-Corporate Relations										
7	Corporate Communications	11	10	9	10	9	(1)	(10)	11	2	22
8	VP-Corporate Relations' Office	2	2	2	2	2	0	0	2	0	0
9	Subtotal	13	12	11	12	11	(1)	(8)	13	2	18
	VP-Energy Delivery										
10	Construction & Maintenance	220	214	207	204	213	9	4	220	7	3
11	Engineering	82	81	78	75	73	(2)	(3)	79	6	8
12	Project Management	7	7	6	6	6	0	0	8	2	33
13	Support Services	87	85	81	78	76	(2)	(3)	81	5	7
14	System Operation	103	105	103	95	95	0	o	109	14	15
15	VP-Energy Delivery's Office	2	2	2	3	3	0	0	3	0	0
16	Subtotal	501	494	477	461	466	5	1	500	34	7
	VP-Finance										
17	General Accounting	23	24	25	25	25	0	0	26	1	4
18	Information Technology & Services	90	91	90	92	90	(2)	(2)	94	4	4
19	Management Accounting & Fin Svcs	21	22	22	21	21	0	0	22	1	5
20	Risk Management	9	9	9	9	9	0	0	9	0	0
21	Financial VP/Treasurer's Office	2	2	2	3	3	0	0	3	0	0
22	Subtotal	145	148	148	150	148	(2)	(1)	154	6	4
	VP-General Counsel										
23	Legal	15	15	15	14	14	0	0	16	2	14
24	VP-Gen Counsel's Office	2	2	2	2	2	0	0	2	0	0
25	Subtotal	17	17	17	16	16	0	0	18	2	13
	VP-Government & Community Affairs										
26	Education & Consumer Affairs	7	7	6	7	6	(1)	(14)	7	1	17
27	Governmental Relations	2	2	2	2	2	0	0	2	0	0
28	Regulatory Affairs	7	6	6	6	5	(1)	(17)	7	2	40
29	VP-Gov't & Comm Affairs' Office	3	4	4	4	5	1	25	5	0	0
30	Subtotal	19	19	18	19	18	(1)	(5)	21	3	17

HECO-WP-811 (revised)

## Hawaiian Electric Company, Inc. Summary--Average Employees

		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
		Recorded						iance	Test Yr Est Varian		
<u>Organization</u>		2000	2001	2002	2003	2004 *	- \(\frac{\forall}{\S}\)	%	2005	v arı	ance %
VP-Power Supply		2000	2001	2002	2002	2007	₹.	70	2003	Ţ	<u>_/0</u>
31	Environmental	21	23	23	21	21	0	0	24	3	14
32	Planning & Engineering	50	51	50	48	51	3	6	55	4	8
33	Production	284	294	288	281	288	7	2	351	63	22
34	VP-Power Supply 's Office	2	1	2	2	2	0	0	2	0	0
35	Subtotal	357	369	363	352	362	10	3	432	70	19
S	r. VP-Energy Solutions										
36	Customer Installations	55	51	50	45	44	(1)	(2)	47	3	7
37	Energy Project	0	0	0	4	6	2	50	8	2	33
38	Energy Services	41	43	42	42	40	(2)	(5)	59	19	48
39	Integrated Resource Planning	0	0	0	2	3	1	50	4	1	33
40	Technology	0	0	0	2	2	0	0	2	0	0
41	Sr. VP-Energy Solutions' Office	0	0	2	3	4	1	33	4	0	0
42	Subtotal	96	94	94	98	99	1	1	124	25	25
S	r. VP-Operations										
43	Customer Service	123	120	116	115	118	3	3	134	16	14
44	Sr. VP-Operations' Office	0	1	2	2	2	0	0	2	0	0
45	Subtotal	123	121	118	117	120	3	3	136	16	13
46 S	r. VP-Public Affairs	0	1	2	2	2	0	0	2	0	0
P	resident's Office										
47	Internal Audit	4	4	4	5	5	0	0	6	1	20
48	President's Office	4	4	3	3	3	0	0	3	0	0
49	Subtotal	8	8	7	8	8	0	0	9	1	13
D	rivisions no longer existent										
50	SVP										
51	VP-Planning										
N	ew Divisions										
52	VP Special Projects					1	1	-	N/A	-	-
53	VP-Customer Solutions					1	1	-	N/A	-	-
54	Company Total	1362	1365	1335	1315	1334	19	1	1493	159	12

<sup>\*</sup> For comparative purposes, the recorded 2004 amounts are presented using the Test Year 2005 organizational structure. Therefore, the following organizational changes in 2004 are not represented on this exhibit:

The Project Management Division (PBP) transferred to the Engineering Department in September 2004. The Government Relations Group (PNI) reports directly to Senior VP-Public Affairs rather than VP-Government &

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HECO-WP-811 (revised)

Community Affairs from December 2004.

The Planning & Engineering Department was renamed Power Supply Engineering in September 2004.

The Generation Planning (PYB) and Transmission & Planning (PYT) Divisions transferred from Planning & Engineering Department to the Power Supply Services Department in September 2004.

A new VP-Special Projects (P2W) reporting to SVP-Operations was created in September 2004.

A new VP-Customer Solutions (P1W) was created on June 28, 2004 to head the Customer Solutions Division, comprised of the former Energy Services and Integrated Resource Planning divisions.

Internal Audit became a part of the new Corporation Audit & Compliance Department in November 2004.

# Ref: T-8, HECO-826 (Staffing).

Please provide retirement eligibility data comparable to HECO-826 for calendar years 2000 through 2003.

# **HECO Response:**

Please see attached for retirement eligibility data comparable to HECO-826 for calendar years 2000 through 2003.

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# Hawaiian Electric Company, Inc. 2005 Test Year

# RETIREMENT ELIGIBILITY

# Number Eligible to Retire in 2000

		(A) 2000 Avg	(	(B)	(	C)	(	D)
		Employee Count	Full Re	etirement	E	arly		minal rement
1	Construction & Maintenance	220	13	5.9%	15	6.8%	46	20.9%
2	System Operations	103	4	3.9%	7	6.8%	19	18.4%
	Number Eligible to Retire in 2005							
		(A) 2005 Avg	(	(B)	()	C)		D)
		Employee Count	Full Re	etirement	<u>Ea</u>	<u>urly</u>		ninal ement
3	Construction & Maintenance	220	56	25.5%	15	6.8%	22	10.0%
4	System Operations	109	20	18.3%	9	8.3%	24	22.0%

Full Retirement	Minimum Age:	50, Age Plus Yrs of Svc =>93
Early Retirement	Minimum Age:	50, Age Plus Yrs of Svc =>88
Nominal Retire	Minimum Age:	50, Age Plus Yrs of Svc =>70

# Hawaiian Electric Company, Inc. 2005 Test Year

# **RETIREMENT ELIGIBILITY**

# Number Eligible to Retire in 2001

		(A) (B) 2001 Avg		(B)	(C) <u>Early</u>		(D)  Nominal  Retirement	
		Employee Count	Full Retirement					
1	Construction & Maintenance	214	15	7.0%	21	9.8%	33	15.4%
2	System Operations	105	3	2.9%	5	4.8%	16	15.2%
		Number Eli (A)	_	Retire in 20		(C)	(	(D)
		2005 Avg Employee	(	<i>D</i> )	(	)		minal
		2005 Avg		etirement		arly	No	
3	Construction & Maintenance	2005 Avg Employee					No	minal
3	Construction & Maintenance System Operations	2005 Avg Employee Count	Full Re	etirement	E	<u>arly</u>	Nor <u>Retir</u>	minal rement

Minimum Age: 50, Age Plus Yrs of Svc =>93 Minimum Age: 50, Age Plus Yrs of Svc =>88

Minimum Age: 50, Age Plus Yrs of Svc =>70

Full Retirement

Early Retirement Nominal Retire

# Hawaiian Electric Company, Inc. 2005 Test Year

# RETIREMENT ELIGIBILITY

# Number Eligible to Retire in 2002

			<del></del>		<u> </u>			
		(A) 2002 Avg	(	(B)	(	C)	(	(D)
		Employee Count	Full Re	etirement	<u>E</u> :	arly_		minal rement
1	Construction & Maintenance	207	15	7.2%	21	10.1%	24	11.6%
2	System Operations	103	5	4.9%	6	5.8%	16	15.5%
	Number Eligible to Retire in 2007  (A) (B) (C) (D)							
		2005 Avg Employee Count	Full Re	etirement	<u>E</u> :	arly		minal rement
3	Construction & Maintenance	220	54	24.5%	4	1.8%	31	14.1%
4	System Operations	109	22	20.2%	2	1.8%	25	22.9%

Full Retirement	Minimum Age:	50, Age Plus Yrs of Svc =>93
Early Retirement	Minimum Age:	50, Age Plus Yrs of Svc =>88
Nominal Retire	Minimum Age:	50, Age Plus Yrs of Svc =>70

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# Hawaiian Electric Company, Inc. 2005 Test Year

# **RETIREMENT ELIGIBILITY**

Number Eligible to Retire in 2003

		(A)	(	B)	(	C)	(	(D)
		2003 Avg Employee Count	Full Re	etirement	<u>E</u> ;	arly_		minal rement
1	Construction & Maintenance	204	1 Q	Q <b>Q</b> 0/	20	0.00/	21	10.20/

2	System Operations	95	6	6.3%	8	8.4%	15	15.8%

# Number Eligible to Retire in 2008

		(A) 2005 Avg Employee	(	(B)	(	C)	·	(D) minal
		Count	Full Re	etirement	<u>E</u>	arly_		rement
3	Construction & Maintenance	220	53	24.1%	2	0.9%	36	16.4%
4	System Operations	109	20	18.3%	4	3.7%	22	20.2%

Full Retirement	Minimum Age:	50, Age Plus Yrs of Svc =>93
Early Retirement	Minimum Age:	50, Age Plus Yrs of Svc =>88
Nominal Retire	Minimum Age:	50, Age Plus Yrs of Svc =>70

# **Ref:** Customer Deposits.

Please provide the actual amounts of Customer Deposit balances by month for the period June 2004 to-date.

# **HECO Response:**

The Customer Deposit balances by month for the period from June 2004 to February 2005 are as

# follows:

June	2004	\$5,144,856
July	2004	\$5,090,420
Aug.	2004	\$5,125,293
Sept.	2004	\$5,124,987
Oct.	2004	\$5,035,822
Nov.	2004	\$5,030,873
Dec.	2004	\$5,065,653
Jan.	2005	\$5,075,469
Feb.	2005	\$5,099,965

# Ref: T-9, page 4 (Customer Accounts).

Has HECO prepared any studies or analyses to quantify the historical relationship between the number of customer accounts and expense levels to determine which cost elements are variable and the degree of variability? If so, please provide a copy of the most recent study in both hard copy and Excel spreadsheet format, with intact cell formulae.

# **HECO Response:**

Yes, HECO, does an analysis to quantify the number of customer accounts and expense levels for postage usage. This was based on a historical average using January through June 2003 actual costs. The 2003 average monthly amount was then increased to reflect the increase in the Average HECO Customer count forecast for 2004 over the 2003 actual year end HECO Customer Count. The 2004 average monthly amount was then increased to reflect the increase in the Average HECO Customer count forecast for 2005 over the Average HECO Customer count forecast for 2004 to give the 2005 monthly average cost. This amount was then multiplied by 12 months to establish the annual 2005 forecast. Please see page 2 for the worksheet reflecting this calculation.

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Jun '03 Actual	\$91,281
May '03 Actual	\$85,484
Apr. '03 Actual	\$88,091
Mar. 103 Actual	\$89,793
Feb. '03 Actual	\$82,239
Jan. '03 Actual	\$86,892
EE Descrip. Freight,	Postage & Bulk Mail
# 11	640
Activity Descrip.	Process Cust Bills
*Act #	614
*HA#	PCP

Calculation for Postage Forecast 2005

\$1,068,588	\$89,049	1.014	\$1,053,840	\$87,820	1.006	\$87,296
Annual	Avg.	over 2004	Annual	Mo. Avg.	over 2003	Mo. Avg.
Forecast	Forecast Mo.	Count 2005	Forecast	Forecast	Count 2004	2003 Actual
2005	2005	in Customer	2004	2004	in Customer	
		% Increase			% Increase	
	2005	to Forecast	2003 Actual Postage Calculated to Forecast 2005	Actual Posta	2003	

HECO CUSTOMER FORECAST	
2004 Average per month HECO Customer Count Forecast as of 3/04 2003 Dec. month actual Year End HECO Customer Count	288,504 286,677 1,827
	1.006
2005 Average per month HECO Customer Forecast as of 3/04 2004 Average per month HECO Customer Forecast as of 3/04	292,710 288,504 4,206
	1.014

# Ref: T-9, pages 4-5 & 19-21 (Uncollectibles).

For the period January 2000 through December 2004, please provide the following information on a monthly basis:

- a. Gross amount of residential account write-offs, before recognizing any recoveries of amounts previously written off.
- b. Amount of any recoveries of residential accounts previously written off.
- c. Gross amount of commercial account write-offs, before recognizing any recoveries of amounts previously written off.
- d. Amount of any recoveries of commercial accounts previously written off.
- e. Please explain the typical time lag between customer billing and the write off of that billing as uncollectible.
- f. Please identify which residential and commercial revenue accounts are considered likely to incur uncollectible activity.

# **HECO Response:**

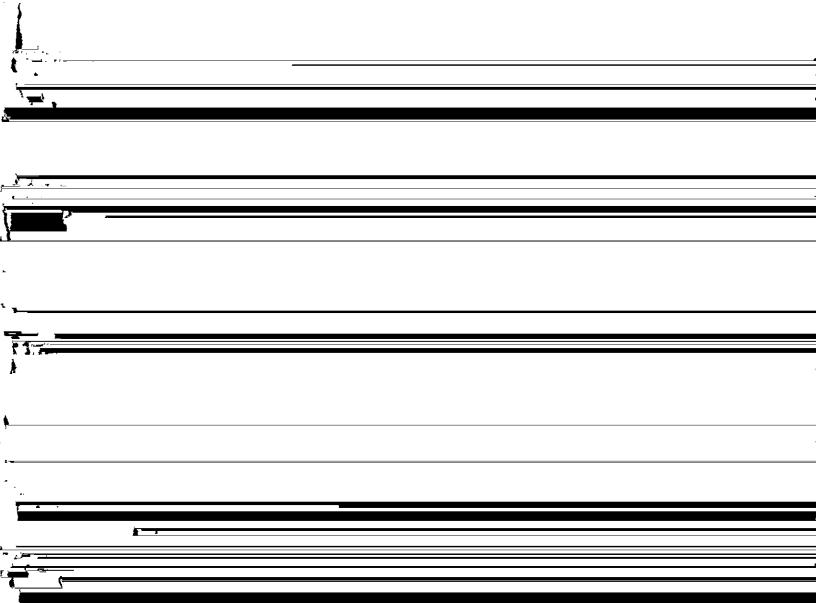
We do not maintain write-offs by customer category. Our current system has the information in total for residential and commercial accounts.

- a. Please see page 2 to this response for the gross amount of residential and commercial account write-offs.
- b. Please see page 2 to this response for the total amount of recoveries of residential and commercial accounts that were previously written off.
- c. See response to part a. above.
- d. See response to part b. above.
- e. HECO's practice is to allow a 90 day collection period for closed accounts with a remaining balance. When an account with a balance is closed, the customer has 30 days to re-

establish/re-connect the account before a reminder letter is generated indicating the past due amount. Fourteen (14) days later or 44 days into the collection period, a Final Request/Notice is generated notifying the customer that the account may be referred to a collection agency if payment is not made within the next 7 days. During the 45 through 90 days following the closing of the account a final attempt to collect the remaining balance is conducted prior to writing off the account and assigning it to a collection agency. Please see page 4 to this response for the time lag data table.

f. The residential and commercial revenue accounts that are most likely to incur uncollectible activities are the ones that have filed for bankruptcy.

2003			2004	
\$	₩.	\$	\$	\$
Recovered	Net	Gr Write-off	Recovered	Net
40,569	41,246	58,256	37,142	21,114
38,340	28,644	74,068	38,022	36,046
45,437	34,835	88,109	41,141	46,968
37,143	44,214	69,846	35,044	34,802
41,060	134,704	73,166	91,894	(18,728)
39,270	150,355	91,027	45,661	45,366
43,637	133,870	71,329	56,255	15,074
34,412	58,455	64,850	47,921	16,928
35,767	44,059	89,890	30,252	59,638
25,198	100,376	65,300	34,739	30,561
32,314	52,368	163,387	36,050	127,336
28,343	152,308	156,938	37,988	118,950
441,490	975,434	1,066,165	532,109	534,055
31.2			49.9	



# HAWAIIAN ELECTRIC COMPANY, INC. Customer Service Department

				Jays fron	Days from Closing Bill Date	Bill Date			
Closed Accounts	7	14	30	37	44	09	<b>4</b> 9	74	06
Closing Bill			Reminder		Final Notice				Write-off
			201101						(APCA)

\* APUA - Allowance Provision for Uncollectible Accounts

# Ref: T-9, pages 6-8 (Customer Accounts-Staffing).

Please provide the following:

- a. Referring to page 7 of the referenced testimony, please provide the actual employee counts for 2004 (average & high).
- b. During 2003, did HECO incur employee overtime and increased contract services charges to provide reasonable service to customers, maintain daily operations and undertake new or additional projects? Please explain.
- c. Referring to the response to part (b) above, does the 2005 test year forecast recognize reduced overtime pay and lower contract work as a result of the higher staffing forecast?
  - 1. If not, explain why not.
  - 2. If yes, please explain how the reduction in costs was recognized in the forecast and provide a pinpoint reference to any workpapers showing this result.

# **HECO** Response:

- a. The actual employee counts for 2004 for the Customer Service Department (average & high) are 119 average and 128 high.
- b. Yes, during 2003, HECO did incur employee overtime and contract services charges to provide service to customers and maintain daily operations.
- c. The 2005 test year estimate recognizes reduced overtime hours, but no difference in contract services charges. As discussed with Mr. Carver of Utilitech on April 26, 2005, HECO is reviewing the standard labor rates used for the test year, and the level of overtime dollars and hours used to determine the standard labor rates. Mr. Carver indicated he was open to further discussion on this matter.
  - The contractor services charges for the test year are required for specialized Information
     Technology support for the Customer Information System or CIS. This requires 1) an
     in depth understanding of the Customer Service System functionality, the CIS data

model, CIS technical design, and interfaces to/from external systems, 2) working closely with users to identify business requirements, evaluate alternative solutions, and design/construct/implement the chosen solution and 3) resolving production problems, coding and testing programs, documenting systems, and mentoring support staff that is responsible for maintaining the current CIS.

2. See attached table on page 3 to this response which shows 1) the 2003 annual recorded overtime % at 2.8%, and the last quarter recorded 2003 at 8.4%, which shows the marked increase in overtime, 2) the 2004 annual recorded overtime at 6.9% and 3) the 2005 forecast of overtime at 2.2%.

OVERTIME COMPARISON 2003, 2004 ANNUAL RECORDED 2003 LAST QTR. RECORDED & 2005 ANNUAL FORECAST

	2003 Anr	2003 Annual Record	rded	2003 Las	2003 Last Otr. Recorded	rded	2004 Ar	2004 Annual Recorded	Zed.	2005	SOOF Assessed	
										E 2007	Finds rore	Cast
RA RA Description	Productive Overtime Hrs Hours		% OT	Productive Hrs	Overtime Hours	% OT	Productive Hrs	Overtime Hours	% OT	Productive Hrs	Overtime	% TO
PCG Field Svc. & Collection	40,057	1,131	2.8%	10.476	944	%U 6	44.647	0	ò			
PCM Meter Reading	58,300	2.739	4.7%	14.096	1 927	12.7%	140,44	2,000	0.7%		1,744	3.8%
PCP Payment Processing	29,025	208	0	7 075	1	0, 7,	77,00		α.υ. «	65,365	1,312	2.0%
PCH Customer Assist Otr	47.040	9 6	> 0	0.77	2	, <del>0</del> %			4.6%	37,568	670	1.8%
	740,74	90/	%Q.	11,418	650	5.7%	45,759	3,589	7.8%	56.584	704	**************************************
	174,424	4,934	% %	43,265	3,649	8.4%	173.463	11 915	700 B	205 820	S VOV V	90

Source: Recorded Information from Payroll Recap Report (HWR82CA). Forecast Information from ResLev05-02-ABM.PLN

# Ref: T-9, page 18, lines 10-23 (Customer Records & Collection).

Please provide the following:

- a. Please identify the specific "initiatives, projects, additional work or other items" that HECO would have undertaken in 2003 with adequate staffing.
- b. Referring to the response to part (a) above, does the 2005 test year forecast include any initiatives or projects deferred from 2003? If so, please identify those projects and provide the amount(s) included in HECO's 2005 test year forecast.

# **HECO Response:**

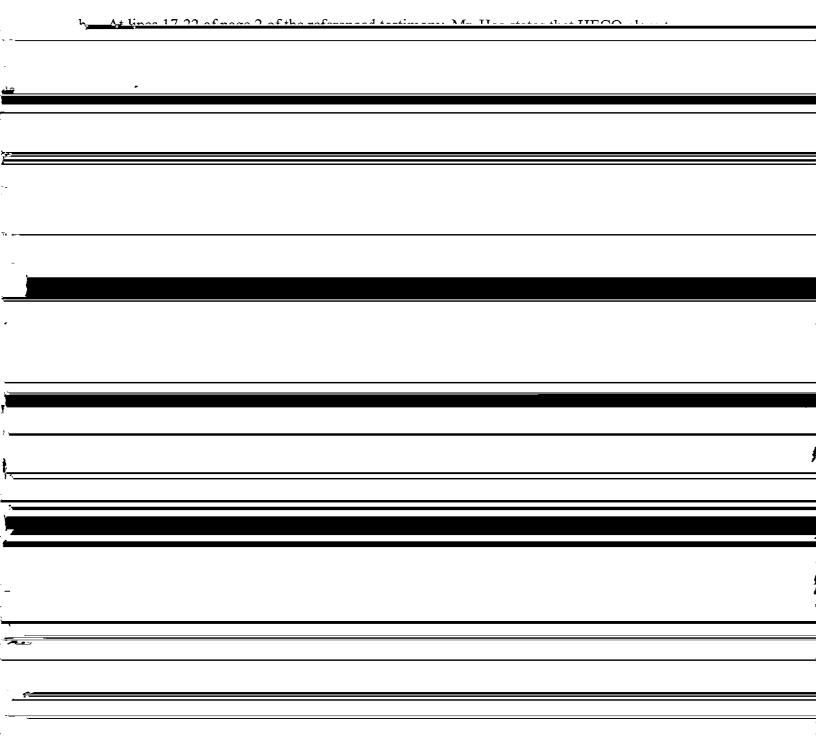
- a. The following shows the areas that would have been addressed with additional staffing.

  They include, training, cross training, succession planning, ensuring there are no skill shortages in meeting future Operations needs and process improvement initiatives. These process improvement initiatives are comprised of statistical analyses, reduce meter reading errors, reduce delayed billings, reduce calls to call center, reduce high bill inquires and reduce escalated customer complaints to executives and the Public Utilities Commission.
- b. Yes, the process improvement initiatives are largely based on having sufficient staffing to meet these initiatives. The required staffing levels to meet these process improvement initiatives are included in the 2005 test year.

# Ref: T-10, page 2 (Customer Service – 2004 Reorganization).

Please provide the following:

a. Were any cost/benefit studies or analyses undertaken to estimate the relative benefits of the reorganization? If so, please provide a copy of such study, including any narrative discussion of assumptions or study development/ conclusions.



provide the test year estimate of the reorganization in rebuttal testimony. In order for the Consumer Advocate to have adequate time to review and analyze such information, please

reporting to the Manager, Energy Services. These three divisions are the Administrative, Pricing, and Customer Efficiency Programs Divisions. With this restructuring, the Manager, Energy Services, is now concentrating his efforts on new DSM programs proposed in this rate case, including the Residential Direct Load Control Program, Commercial and Industrial Direct Load Control Program, Energy\$olutions for the Home, and Residential Low Income Program. HECO has also proposed modifications to the existing DSM programs. The Manager, Energy Services, is responsible for pursuing innovative rates, such as residential time of use rates that involve the customers in decisions about energy consumption and costs.

The estimated O&M impact of the reorganization to the Customer Services block of accounts is an increase of \$370,292 (direct charges only) and \$504,660 with on-costs factored in. The estimated O&M impact of the reorganization to the Company is \$307,313 (direct charges only) and \$413,917 with on-costs factored in. Please refer to pages 3 to 9 for the analyses performed and the underlying assumptions used to quantify the O&M dollar impact of the reorganization. In addition to employee changes indicated at lines 17-22 of HECO T-10, page 2, the analyses factor in an additional unforecasted DSM Engineer position that was filled December 2004. Due to the increased emphasis on the need for DSM measures, and due to a reorganization of the Customer Installation Department (CID), an engineer position was transferred from CID to the Energy Services Department. This

transfer has resulted in an increase in labor costs for the Customer Camine Linds of

CA-IR-78 DOCKET NO. 04-0113 PAGE 3 OF 9

# ESTIMATED 2005 O&M IMPACT SUMMARY CUSTOMER SERVICE BLOCK OF ACCOUNTS POST REORGANIZATION

Customer Services Block Impact	Direct <u>Charges</u>	On-Costs	Total
Estimated Labor	<u>\$346,292</u>	<u>\$134,368</u>	<u>\$480,660</u>
Estimated Nonlabor	<u>\$24,000</u> **	-	<u>\$24,000</u>
Total	\$370,292	\$134,368	\$504,660

# ESTIMATED 2005 O&M IMPACT SUMMARY COMPANYWIDE IMPACT POST REORGANIZATION

Companywide Impact			
	Direct		
	<u>Charges</u>	On-Costs	<u>Total</u>
Estimated Labor			
Customer Services Block	\$346,292	\$134,368	\$480,660
A&G Operations	<u>(\$62,979)</u>	(\$27,764)	(\$90,743)
	<u>\$283,313</u>	\$106,604	\$389,917
Estimated Nonlabor			
Customer Services Block	<u>\$24,000</u> **		\$24,000
Total	\$307,313	\$106,604	\$413,917

<sup>\*\*</sup> A new RA (P1W) was formed that consists of the VP Customer Solutions and Executive Secretary. Estimated nonlabor monthly charges of \$2,000 (\$24,000 annual) has been forecasted to allow for material, outside services, consultants and other sundry expenditures in support of this new RA.

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sed to estimate the 2005 O&M impact of the Executive Secretary who supports the VP Customer Solutions, a reorganization that became effective June 28, 2004. Reorganization occurred after the 2005 Budget cutoff sition was not factored into the 2005 Test Year Rate Case O&M Estimates.

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# Required Data Entry Field

Note: The above worksheet was used to estimate the 2005 O&M impact of the new Planning Analyst position for the Forecasts & Research Division.

New position resulted subsequent to the reorganization that became effective June 28, 2004. Reorganization occurred after the 2005 Budget cutoff period and therefore this position was not factored into the 2005 Test Year Rate Case O&M Estimates.

With the reorganization, the four existing Planning Analyst positions were transferred as follows: One Planning Analyst went to Energy Service SA Division. The remaining three Planning Analysts were transferred to SM Division. A new Planning Analyst position was subsequently created in the SM Division. This position was eventually filled on January 10, 2005.

Total estimated productive 2005 O&M hours approximate 1,836 hours.

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Required Date Entry Field

Note: The above worksheet was used to estimate the 2005 O&M impact of the VP Customer Solutions. New position resulted due to a reorganization that became effective June 28, 2004. Reorganization occurred after the 2005 Budget cutoff period and therefore this position was not factored into the 2005 Test Year Rate Case O&M Estimates.

Total estimated productive 2005 O&M Hours approximate 1,844 hours.

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Note: The above worksheet was used as the 2005 labor input for the Director - Forecasts and reflects the impact to HECO 2005 O&M only
In reorganization, this position was eliminated and the Forecasting function was assumed by George Willoughby, Director of Research
& Evaluation who then was named Director, Forecasting & Research.

Productive 2005 O&M Hour

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2005 O&M impact of the new DSM Engineer position in the Energy Services Department.	hat was added to Energy Services subsequent
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CA-IR-78b.xls SheetDSM Engineer Addition

# Ref: T-10, page 4 (Customer Service – Green Power Program).

Please provide the following:

- a. Identify and describe the specific Green Power initiatives that HECO plans to undertake.
- b. At lines 23-25 of page 4 of the referenced testimony, Mr. Hee indicates that "other utilities have found that customers are interested and willing to pay a premium rate for electricity generated from those [Green Power] sources." Does HECO plan on provisioning such Green Power energy as a regulated or unregulated service? Please explain.
- c. Referring to the response to part (b) above, is HECO considering, or does the Company currently plan to sell Green Power energy to customers above cost plus a reasonable return? Please explain.

# **HECO Response:**

- a. HECO does not have any specific initiatives under consideration at this time. In its response to CA-IR-2, HECO T-10, page 5 of 6, HECO explains that the details of the program have not yet been determined. HECO will use the budgeted funds to have a consultant to develop this program, and for the implementation of the program in future years.
- b. HECO envisions that the Green Power program would be initiated on a regulated basis.
- information at this time. However, over 500 utilities, including investor-owned, municipals, and cooperatives, are developing or have implemented a Green Pricing program. (See the following U.S. Department of Energy website:

http://www.eere.energy.gov/greenpower/markets/pricing.shtml?page=0.) HECO's program, as described on pages 4 and 5 of HECO T-10, would be similar to these programs in that it would also support renewable energy.

# Ref: Normalization adjustment for periodic ELLIPSE upgrades.

Please provide the following:

- a. A detailed narrative description of ELLIPSE (or comparable previous software programs) that were purchased during the past ten years, stating also the implementation date(s) and attendant costs incurred by NARUC account.
- b. A copy of any updated Mincom retirement notices such as provided in exhibit HECO-1309.
- c. Referring to exhibit HECO-1309, please note which of the listed Mincom products HECO currently owns or leases for the Company's use.
- d. Any and all additional correspondence from Mincom regarding future upgrades, future retirements, cost estimates of forthcoming products, capabilities of upgrades, etc. in HECO's (or affiliate's) possession.

# **HECO Response:**

- a. Requested information is provided on page 2 of this response.
- b. A copy of the December 2004 Mincom retirement notice is provided on page 3 of this response.
- c. HECO currently owns Mincom LinkOne 4.x and Ellipse 5.2.3. Mincom Window Designer
  - is included in Ellipse 5.2.3.
- d. There is no correspondence from Mincom regarding future upgrades, future retirements, cost estimates of forthcoming products, capabilities of upgrades, etc.

Software Program: MIMS

Implementation Date: January 1999

Description:

Description was provided in HELCO T-10. Docket No. 99-0207 (HELCO's Test Year 2000 rate

case), primarily pages 3-5.

# Costs by NARUC:

The total amount of \$9,659,000 as shown below represents the HECO portion of external software purchase and installation costs that were initially deferred and subsequently amortized over a five year period. These costs do not include any business process improvement costs nor do they include costs allocated by HECO to HELCO and MECO.

	Amount
NARUC	(\$000)
186020 Draiget ADDDTCE costs	0.050

Software Program: Ellipse

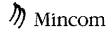
Implementation Date: October 2003

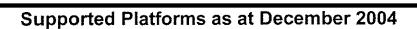
# Description:

Mincom Ellipse is the latest enterprise resource planning (ERP) solution Mincom offers as an upgrade to MIMS. The Ellipse Graphical User Interface was enhanced from the old MIMS SmartGUI to promote ease of use. Architecturally, the client application was re-written to be more object oriented and user friendly which allows for easier integration with outside data. In general, the functionality of the system did not change.

# Costs by NARUC:

The total amount of \$894,000 as shown below represents the total Ellipse upgrade non-labor costs incurred. Internal labor costs incurred in the upgrade were charged to accounts normally





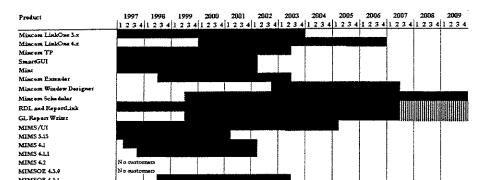
#### Product Lifecycle Policy

Mincom is committed to providing robust, scalable solutions which use proven platforms that take advantage of current technological advancements. Through continuous product improvement Mincom delivers the highest levels of support and extensive functionality.

## Mincom Retirement

Mincom retires older versions of its products at the end of their 1ifecycle, issuing retirement notices for these products to allow customers to plan their upgrades to enhanced versions. These notices are published on the Mincom Product Roadmap web page that can be accessed through the Mincom Customer Support web site. This page will be updated each June and December to assist Mincom customers with planning their upgrade process.

# **Product Lifecycle of Mincom Products and Product Releases**



# Ref: Application to the Internal Revenue Service.

Please provide the following:

- a. A copy of the Company's application to the Internal Revenue Service as discussed at page 37 of Mr. Shiraki's direct testimony.
- b. A copy of all studies/analyses undertaken in the decision to make an application to the IRS.
- c. The calculation of all changes that will be necessary to the Company's proposed test year cost of service if the Company's application in granted in total by the IRS.

# Response:

- a. The Company's application to the Internal Revenue Service, the spreadsheet analysis and Deloitte and Touche presentation, contain confidential Company financial information. The Company will provide the information to the Consumer Advocate and the Commission under protective order once a protective order is issued in this proceeding.
- b. A spreadsheet analysis was prepared just prior to filing the application to change our method of accounting. Also, a Deloitte & Touche presentation, which was used in the Company's analysis of the change in tax accounting method is also available. The analysis and presentation contain confidential Company financial information. The Company will provide the information to the Consumer Advocate and the Commission under protective order once a protective order is issued in this proceeding.
- c. If the application for change were granted by the IRS, amended returns would be filed. The amended returns would include the additional deductions for overhead expenditures allocated to deductible expense under the new method, generating a refund claim. The amended returns would be examined by the IRS examination group and the computations

would have to pass this review before any refund check is realized by the Company. Thus, at this time the Company does not expect the application for a change in tax accounting methods to impact current or deferred income taxes in 2005.

Hypothetically, if the Company's application were approved by the IRS in the amount requested and changes were to be incorporated in the test year, changes to accumulated deferred income tax liability and working cash would be necessary. Deferred income tax liability at December 31, 2005 would be adjusted by \$38,257,000 (\$98,322,471 \* 38.91%). The change to working cash would depend on the timing of the refund check.

Pages 3 to 41 contain confidential financial company information and will be provided to the Consumer Advocate and the Commission under protective order once a protective order is issued in this docket.

# Ref: Computer software development costs.

Please provide the following regarding computer software development costs included within the 2005 test year cost of service:

- a. For any computer software development costs that have previously been, or are projected to be, deferred prior to or during the 2005 test year, please provide:
  - 1. a description of the project;
  - 2. initial costs capitalized;
  - 3. cite authorizing regulatory order, if applicable;
  - 4. date(s) deferral was initially recorded;
  - 5. date amortization began and date amortization is scheduled to cease;
  - 6. beginning and end of 2005 capitalized costs;
  - 7. annual amortization; and
  - 8. a copy of all feasibility studies addressing need/justification for project.
- b. For any computer software development costs that are budgeted to be expensed during the 2005 test year, please provide the following:
  - 1. a description of the project;
  - 2. costs forecasted to be expensed by month by NARUC account; and
  - 3. all feasibility studies addressing need/justification for the project.

# **HECO Response:**

a. Currently, there are no computer software development costs incurred by HECO prior to 2005 that will be deferred to the 2005 test year. During the 2005 test year however, HECO is expected to incur deferred software development costs for the Customer Information System ("CIS"), Outage Management System ("OMS") and the Human Resources Suite. For the requested information on these software development projects, please refer to Docket No. 04-0268 for the CIS project, Docket No. 04-0131 for the OMS project and to the testimony of Ms. Julie Price in HECO T-15 (pages 36 to 38) for the Human Resources Suite project.

- b. Major computer software development costs that are budgeted to be expensed during the
   2005 test year include:
  - Electric Facilities Management Systems (EFMS) Program costs. Electric Facilities
     Management Systems represent HECO computer based systems that support CADD
     (Computer Aided Design & Drafting) and AMFM (Automated Mapping & Facilities
     Management) services. These systems provide technologies that facilitate design,
     installation, and life cycle management of HECO electric infrastructure components.
     The total costs consist of several subprojects including:

The 2005 annual EFMS budget by NARUC account includes:

<u>NARUC</u>		2005 Budget
184050 Cl	earing – Power Supply	\$65,880
184060 Cl	earing – Energy Delivery	290,970
514020 M	aint Misc Steam Plant - Waiau	3,050
514030 M	aint Misc Steam Plant - Kahe	3,050
566 M:	isc Trans Oper Expenses	15,250
588 M:	isc Distribution Oper Expenses	65,880
921 Ac	lmin & Genl Exp – Nlabr	<u>165,919</u>
Total		\$610,000

1/12 of the annual amount is budgeted in each month.

• E-Business (EBus) Program costs. EBusiness consists of our online services, including web page services and e-mail contacts with our customers, web and database application development and support to provide employees with the information and data access they need to service their customers and do their jobs. These costs do not include the amortization of the initial installation and implementation costs for the e-business software, which was excluded from Test Year 2005 expense, as discussed at HECO T-13, pages 49-50.

The total costs consist of subprojects including:

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$170,000 - CheckFree i-Series upgrade and bypass billprint enhancements

170,000 - eGain e-mail application replacement (Vignette Dialog/Messenger)

30,000 - Vignette Dynamic Portal

140,000 - Installation and Configuration Services for above applications

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$510,000 Total
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The 2005 annual and monthly EBus budget by NARUC account includes:

<u>NARI</u>	<u>JC</u>	2005 Budget
903	Customer Records & Collectn Exp	\$108,156
910	Customer Assistance Expenses	98,892
921	Admin & Genl Exp - NLabr	302,952
Total	-	\$510,000

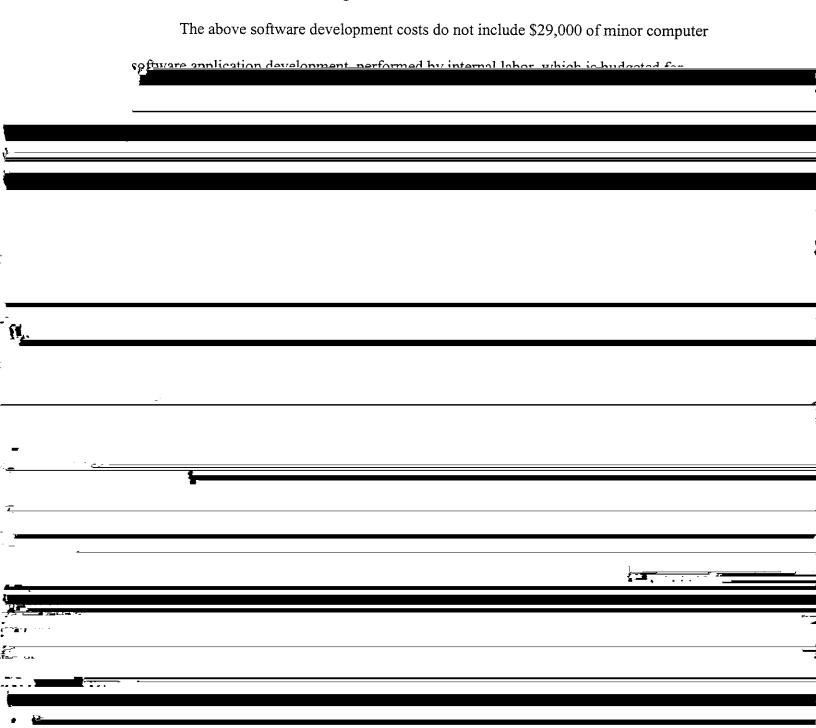
1/12 of the annual amount is budgeted in each month.

Middleware costs. Middleware, application-to-application interfaces, is a solution for
enterprise application integration and interoperability among systems. The initial
middleware application will be configured to pull Insurance Coverage data from the
Tesseract (Benefits) system and translate the data into appropriate data files for Benefit
Carriers.

The 2005 annual and monthly Middleware budget by NARUC account includes:

<u>NARUC</u>		2005 Budget
581	Load Dispatching – Dist Oper	\$20,955
593	Maint of Overhead Lines - Dist	21,590
921	Admin & Genl Exp - NLabr	20,955
Total	•	\$63,500

1/12 of the annual amount is budgeted in each month.



#### Ref: Computer software development costs.

Please provide the following for computer software development costs that were expensed (as opposed to deferred and amortized) during calendar years 2002 through 2004:

- a. Narrative description of each project;
- b. Amount expensed by year by NARUC account; and
- c. A copy of all feasibility studies addressing need/justification for each project.

#### **HECO** Response:

- a. Computer software development costs for major programs/applications that were expensed during 2002-2004 include:
  - Electric Facilities Management Systems (EFMS) Program costs. Electric Facilities
     Management Systems represent HECO computer based systems that support CADD
     (Computer Aided Design & Drafting) and AMFM (Automated Mapping & Facilities
     Management) services. These systems provide technologies that facilitate design,
     installation, and life cycle management of HECO electric infrastructure components.
  - E-Business (EBus) Program costs. EBusiness consists of our online services, including
    web page services and e-mail contacts with its customers, web and database application
    development and support to provide employees with the information and data access
    they need to service their customers and do their jobs.
  - Middleware Project costs. Middleware, application-to-application interfaces, is a
    solution for enterprise application integration and interoperability among systems. The
    initial middleware application will be configured to pull Insurance Coverage data from
    the Tesseract (Benefits) system and translate the data into appropriate data files for
    Benefit Carriers.

- MIMS. See HECO's response to part a of CA-IR-80 for a description of the project.
- Ellipse. See HECO's response to part a of CA-IR-80 for a description of the project.
- We also incur costs for minor software development (costs for such projects which amount to less than \$250,000.) The total annual amounts of these charges (with the number of applications developed) are as follows:

2004: \$94,255 (14 applications) 2003: \$172,363 (17 applications) 2002: \$151,253 (12 applications)

b. EFMS software development expense, by NARUC Account, by year:

<b>NARUC</b>		2004	2003	2002
184050	Clearing – Power Supply	\$28,969	\$78,511	\$21,259
184060	Clearing - Energy Delivery	127,949	346,755	93,893
514020	Maint Misc Steam Plant - Waiau	1,341	3,635	984
514030	Maint Misc Steam Plant - Kahe	1.341	3.635	984
566	Misc Trans Oper Expenses	6,706	18,174	4,921
588	Misc Distribution Oper Expenses	28,969	78,511	21,259
921	Admin & Genl Exp - NLabr	72,960	197,730	53,541
Total	-	\$268,236	\$726,950	\$196,840

EBus software development expense, by NARUC Account, by year:

<u>NARUC</u>		<u>2004</u>	<u>2003</u>	2002
903	Customer Records & Collectn Exp	\$108,474	\$95,541	\$19,237
910	Customer Assistance Expenses	99,181	87,357	17,589
921	Admin & Genl Exp - NLabr	303,842	267,617	53,885
Total		\$511,497	\$450,515	\$90,711

These amounts do not include the amortization of the initial installation and implementation costs for the e-business software, which was discussed at HECO T-13, pages 49-50.

#### Middleware software development expense by year:

<u>NARUC</u>		<u>2004</u>	20	003	2	2002
581	Load Dispatching – Dist Oper	\$148,461	\$	0	\$	0
593	Maint of Overhead Lines-Dist	152,960		0		0
921	Admin & Genl Exp - NLabr	148,461		0		0
Total	•	\$449,882	\$	0	\$	0

MIMS software development expense by year:

# As discussed in HECO's response to part a of CA-IR-80, the MIMS external software

purchase and installation costs were initially deferred then amortized over a five year period. This amortization started in 1999 and ended in 2003. However, such costs were not included in determining HECO's rate of return calculations for 2001 through 2003 as a result of Decision and Order No. 18365, dated February 8, 2001 in Docket No. 99-0207. Below are the costs by NARUC expensed in 2002 through 2004 for amortization of the MIMS costs:

<u>NARUC</u>		<u>2002</u>	<u>2003</u>	<u>2004</u>
502030	Steam Exp-Kahe	23,233	23,234	0
505030	Electric Expenses-Kahe	19,319	19,318	0
512030	Maint Boiler & Fo Plant-Kahe	29,394	29,394	0
513030	Maint Electric Plant-Kahe	17,637	17,637	0
514030	Maint Misc Steam Plant - Kahe	14,538	14,539	0
562	Station Expenses-Trans Oper	5,206	5,206	0
563	Overhead Line Exp-Trans Oper	5,042	5,042	0
566	Misc Trans Oper Expenses	43,212	43,211	0
570	Maint of Station Equip-Trans	3,215	3,214	0
571	Maint of Overhead Lines-Trans	6,894	6,894	0
582	Station Expenses-Dist Oper	7,441	7,441	0
583	Overhead Line Exp-Dist Oper	7,637	7,638	0
584	Undergrnd Line Exp-Dist Oper	6,743	6,743	0
592	Maint of Substn Equip-Dist	3,883	3,883	0
593	Maint of Overhead Lines-Dist	12,034	12,034	0
594	Maint of Undergrnd Lines-Dist	11,621	11,621	0
598	Maint of Misc Dist Plt	144,173	144,173	0
921	Admin & Genl Exp - NLabr	484,587	484,586	0
9302	Misc Genl Expenses	1,102,233	1,102,232	0
Total		1,948,041	1,948,041	0

### Ellipse software development expense by year:

<u>NARUC</u>		<u>2002</u>	<u>2003</u>	<u>2004</u>
1861	Chgs bill to assoc cos	68	99	9
921	Admin & Genl Exp - Nonlabor	271	410	37
Total	_	339	509	46

c. The above software development costs are based on prioritized HECO departmental needs and requests. Feasibility study documents are not available.

	Ref: Computer software development costs.
-2	District de la
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-	

- development costs stating specifically when such costs are deducted/depreciated for purposes of calculating federal taxable income.
- b. To the extent the deduction/amortization is faster or slower than book expense/amortization, please note which accumulated deferred income tax account is employed and provide the beginning and end of 2005 test year balance for same.

#### **HECO Response:**

a. Under Internal Revenue Code §167(f), purchased (ready to use) computer software

	Beginning	Ending	Source
28327 Software - Fed	(115,814.11)	(162,582.01)	HECO-WP-1705a, page 4 of 6
28327 Software - State	(34,949.84)	(45,752.86)	HECO-WP-1705b, page 4 of 6
Total	(150,763.95)	(208,334.87)	

Deferred taxes on CIS project costs are included in CIS project, category #28532. For tax purposes, Stage 1 costs are capitalized.

	Beginning	Ending	Source
28532 CIS Project - Fed	134,499.00	134,499.00	HECO-WP-1705a, page 5 of 6
28532 CIS Project - State	24,594.00	24,594.00	HECO-WP-1705b, page 5 of 6
Total	159,093.00	159,093.00	

Deferred taxes on e-business software are included in Software (e-business), category #28524. For tax purposes, costs are depreciated over 3 years.

	Beginning	Ending	Source
28524 E-business - Fed	(44,266.95)	(30,622.72)	HECO-WP-1705a, page 5 of 6
28524 E-business - State	(8,465.91)	(6,194.02)	HECO-WP-1705b, page 5 of 6
Total	(52,732.86)	(36,816.74)	•

### Ref: HECO-1608, HECO-1609, HECO-WP-1610, HECO-WP-1611.

Please provide fully linked and calculating Depreciation Expense and Accumulated Depreciation Reserve exhibits, including supporting T-16 workpapers.

### **HECO Response:**

Exhibits HECO-1608 to HECO-1611 are not linked. There are no HECO-WP-1610 and HECO-WP-1611 workpapers.

#### Ref: Revision discussed at page 22.

Please provide the revised/updated 2005 estimate for depreciation expense that reflects the new depreciation rates effective September 3, 2004 (that the Company intends to update during rebuttal).

#### **HECO Response:**

The updated 2005 total utility book depreciation and amortization expense, based on recorded information as of December 31, 2004 and the new depreciation rates effective

September 3, 2004, is \$80,132,009. This represents a \$1,341,691 decrease in total utility book depreciation and amortization expense of \$81,473,700, as shown at HECO-1608 to HECO-1611 and HECO-WP-1601 and HECO-WP-1603. The \$80,132,009 is comprised of book depreciation of \$73,931,522 and book amortization of \$6,148,209 as shown on pages 2 and 3 of this response, respectively and \$52,278 of depreciation allocated to utility for the E-business capitalized asset.

Hawaiian Electric Company, Inc. DOCKET NO. 04-0113 2005 Utility Book Depreciation PAGE 2 OF 3

Based on D & O 21331 (2000 Depr Study Approved Rates)

Account	Depreciable Assets as of 1/1/05	Straight-Line Remaining-Life Rates	Depreciation Accrual Year 2005
311	74,243,430.64	0.01927	1 420 670 04
312			1,430,670.91
314		0.01714	4,382,266.93
	1	0.01362	1,575,477.17
315		0.01737	461,732.79
316		0.02337	517,551.85
Tot - Stean	1 494,320,272.94	0.01693	8,367,699.65
341	1,138,766.21	0.00890	10,135.02
342	1,401,118.53	0.01569	21,983.55
343	7,290,030.06	0.00876	63,860.66
344	5,379,110.80	0.01131	60,837.74
345	2,700,633.69	0.01776	47,963.25
346	289,551.80	(0.00640)	
Tot - Gas Turt			(1,853.13)
rot-Gas ruit	18,199,211.09	0.01115	202,927.09
Tot - Proc	E42 E40 404 02	0.04070	
101 - 1100	512,519,484.03	0.01672	8,570,626.74
3501	0 590 529 63	0.00000	96 305 05
	9,589,538.63	0.00900	86,305.85
352	39,779,529.98	0.02400	954,708.72
353	197,003,276.74	0.02560	5,043,283.88
354	17,404,405.76	0.02570	447,293.23
355	142,293,589.72	0.03090	4,396,871.92
356	68,490,093.89	0.05190	3,554,635.87
357	25,184,437.96	0.01700	428,135,45
358	37,452,018.36	0.02410	902,593.64
359	2,395,527.80	0.01580	37,849.34
Tot - Transm		0.02938	
701 71011011	000,002,410.04	0.02530	15,851,677.90
3601	288,535.71	0.02050	5,914.98
361	20,008,532.81	0.03350	670,285.85
362	110,341,198.25		
364		0.02990	3,299,201.83
	91,693,347.90	0.03290	3,016,711.15
365	85,135,810.76	0.06540	5,567,882.02
366	190,590,063.95	0.02200	4,192,981.41
367	204,306,716.72	0.05450	11,134,716.06
368	113,444,606.52	0.06050	6,863,398.69
369.1	34,489,244.46	0.07260	2,503,919.15
369.2	123,452,763.00	0.03950	4,876,384.14
370	24,293,433.69	0.03050	740,949.73
Tot - Distr	998,044,253.77	0.04296	42,872,345,01
			,,,
Tot - T & D	1,537,636,672.61		58,724,022.91
390	24,619,702,44	0.04090	1,006,945.83
394	2,227,192.00	0.03670	81,737.95
395	150,982.77	0.03450	5,208.91
397	59,331,271.68	0.05940	-
398			3,524,277.54
Tot - General	2,330,493.86	0.05180	120,719.58
rot - General	88,659,642.75	0.05345	4,738,889.81
Cub Takel	2 420 045 700 00		
Sub-Total	2,138,815,799.39		72,033,539.46
3902 (King)	6,180,188.80	0.04404	00.707.40
	· ·	0.01404	86,787.43
3902 (CPP)	755,374.51	0.04919	37,159.93
3902 (Hon CI)	6,883.11	0.00000	0.00
Sub Tat I I I I	6040 440 40		
3ub-Tot- LH Impr	6,942,446.42		123,947.36
392	24,402,129.12	0.07270	1,774,034.79
) tailin	0.470.400.074.00		
Ounty rotal	2,170,160,374.93	0.03407	73,931,521.61

### Hawaiian Electric Company, Inc. 2005 Utility Book Amortization Based on D & O 21331 (2000 Depr Study Approved Rates)

Account	Amort Amts as of 1/1/05	Amortization Rates	Amortization Accrual Year 2005	Unrecovered Amortized Amounts	Total Amortization
316	4,019,369.44	0.05000	200,968.47	438,899.00	639,867.47
Tot - Steam	4,019,369.44	0.05000	200,968.47	438,899.00	639,867.47
346 Tot - Gas Turb	18,759.38 18,759.38	0.05000 0.05000	937.97 937.97	(5,128.00) (5,128.00)	(4,190.03) (4,190.03)
Tot - Prod	4,038,128.82	0.05000	201,906.44	433,771.00	635,677.44
750 1150	1,000,110.02	0.0000	201,300.44	433,771.00	035,677.44
3911	8,553,800.66	0.14286	1,221,995.96	905,931.00	2,127,926.96
3912	1,746,763.98	0.08334	145,575.31	244,867.00	390,442.31
3913	7,371,289.24	0.06667	491,443.85	716,208.00	1,207,651.85
393	819,472.12	0.04000	32,778.88	25,245.00	58,023.88
394	8,492,446.39	0.06670	566,446.17	688,021.00	1,254,467.17
395	1,688,522.17	0.06670	112,624.43	199,239.00	311,863.43
396	313,105.07	0.05556	17,396.12	27,200.00	44,596.12
398	1,208,065.81	0.05000	60,403.29	57,157.00	117,560.29
Tot - General	30,193,465.44	0.08772	2,648,664.01	2,863,868.00	5,512,532.01
Utility Total	34,231,594.26	0.08327	2,850,570.45	3,297,639.00	6,148,209.45

#### Ref: Annual vehicle depreciation cleared.

#### Please provide:

- a. The 2005 budgeted vehicle depreciation as calculated in total, and as allocated/assigned/cleared to NARUC account. Provide all supporting calculations in hard copy and computable Excel spreadsheet format.
- b. The total 2003 and 2004 vehicle depreciation, as well as amounts cleared to NARUC account in each period.

#### **HECO** Response:

a. The 2005 vehicle book depreciation is \$1,774,035 as shown calculated for account 392 on page 2 of HECO's response to CA-IR-86. The distribution of 2005 vehicle book depreciation to NARUC account was estimated based on the forecasted allocation of vehicle expense to NARUC account rounded to the nearest whole percentage. The forecasted allocation of vehicle expense is based on the departments' budgeted account designation for assigned vehicles and budgeted pool vehicle usage. See distribution calculation at CA-IR-87, Page 3. Vehicle expense charged to clearing accounts, primarily Energy Delivery and

	Customer Installation are cleared to NARIIC account as overhead or an acct above
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• *	

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	August 2004 and 0 07770 for Sentember to December 2004 (Decision & Onder No. 21221	
ι.		

#### Hawaiian Electric Company, Inc. 2003, 2004, and 2005 Distribution of Vehicle Depreciation Based on 2003, 2004, and 2005 Distribution of Vehicle Expense

Account	Account Description	2003 % Allocation	2003 Veh Depr	2004 % Allocation	2004 Veh Depr	2005 % Allocation	2005 Veh Depr
	Total Vehicle Depreciation		1,319,943		1,473,483		1,774,035
107	Construction Work in Progress	1	13.199	1	14,735		•
163	Stores Expense	5	65,997	5	•	_	0
184060	Clearing Acct - Energy Delivery	71	937,160		73,674	5	88,702
184080	Clearing Acct - Customer Install	2	•	71	1,046,173	78	1,383,747
502	Steam Expense	۷.	26,399	1	14,735		0
506		1	13,199	1	14,735	1	17,740
	Misc Steam Power Expense	1	13,199	1	14,735	1	17,740
512	Maintenance of Boiler Plant	2	26,399	3	44,204	1	17,740
513	Maintenance of Electric Plant	1	13,199	1	14,735	1	17,740
571	Maintenance of Overhead Lines	2	26.399	2	29,470	ż	35,481
586	Meter Expense	1	13,199	2	29,470	1	17,740
598	Maintenance of Misc Distribution Plant	1	13,199	-	0	•	•
902	Meter Reading Expense	4	52,798	3	-	•	0
903	Customer Records and Collection Exp	1	13,199	٥	44,204	3	53,221
910	Customer Assistance Expense	4	•	_	0	1	17,740
921	Office Supplies and Expense	,	13,199	1	14,735	1	17,740
925		3	39,598	4	58,939	3 -	53,221
	Injuries and Damages	2	26,399	3	44,204	2	35,481
932	Maintenance of General Plant	1	13,199	1	14,735		0
		100	1,319,943	100	1,473,483	100	1.774.035

#### Note:

2003 and 2004 is based on actual vehicle depreciation and distribution of vehicle expense 2005 is based on estimated vehicle depreciation and forecasted distribution of vehicle expense The allocation to NARUC account was rounded to the nearest whole percentage.

#### Ref: HECO-1704 Development of State Capital Goods Excise Tax Credit

Please provide a schedule showing the following actual data for all vintages through 2003 and estimated for 2004 and 2005:

- a. Capital expenditures generating the state capital goods excise tax credit;
- b. State capital goods excise tax credits generated in each year; and
- c. Calculation or basis for amortization period chosen for each vintage.

The requested information is attached. See pages 8 through 45.

#### **HECO Response:**

		p8	
r	The requested information is attached	Saa nagaa 2 through 7	The arrest transaddition

represents the accrued state ITC and amortization. If the actual tax return amount differed from the accrual, an adjustment was made in the subsequent year as a post year end adjustment.

c. The amortization period is 30 years. See amortization schedule on pages 2 through 7.

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HAWAIIAN ELECTRIC CO.,	INC	1	1	· · · · · · · · · · · · · · · · · · ·	<del></del>	PAGE 2	OF 45	
ACCUMULATED DEFERRE	D STATE ITC							
ACCOUNT #255200						<u> </u>		
	· · · · · · · · · · · · · · · · · · ·					<del> </del>		
	(DR) / CR	62.0301%	62.0301%	62.0301%	62.0301%	62.0301%	61.0902%	61.09029
	TOTAL	1988	1989	1990	1991	1992	1993	1994
A -L-PA								1
Additions	540,833.00	540,833.00						
Amortization Balance 12/31/88			ļ					1
Data RCe 12/31/88	540,833.00	540,833.00						
Additions	1 000 000 00							
Amortization	1,260,833.88 (18,028.00)	(10 000 00)	1,260,833.88					
Balance 12/31/89	1.783.638.88	(18,028.00) 522,805.00	<u> </u>					
	1,700,000.00	322,603.00	1,260,833.88		<u> </u>			
Additions	2,948,915.90			0.040.045.00				
Amortization	(60,056.00)	(18,028.00)	(42,028,00)	2,948,915.90				
89 PYE AJEs-additions	7,682.00	(10,020.00)	(42,026.00)	7,682.00				
Balance 12/31/90	4,680,180.78	504,777.00	1,218,805.88	2,956,597.90			ļ <u>.</u>	ļ
				2,000,057.90	<u> </u>			
Additions	1,232,436.27				1,232,436.27			
Amortization	(158,609.00)	(18,028.00)	(42,028.00)	(98,553,00)	1,202,400.2/		1	<u> </u>
Balance 12/31/91	5,754,008.05	486,749.00	1,176,777.88	2,858,044.90	1,232,436.27			<del> </del>
								<del> </del>
Additions	2,064,582.00					2,064,582.00		1
Amortization	(199,690.00)	(18,028.00)	(42,028.00)	(98,553.00)	(41,081.00)	-,,		
Balance 12/31/92	7,618,900.05	468,721.00	1,134,749.88	2,759,491.90		2,064,582.00		
Additions	2,380,698.00						2,380,698,00	
Amortization	(268,509.00)	(18,028.00)	(42,028.00)	(98,553.00)	(41,081.00)	(68,819.00)	_,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Balance 12/31/93	9,731,089.05	450,693.00	1,092,721.88	2,660,938.90	1,150,274.27	1,995,763.00	2,380,698.00	
A 4742								
Additions	2,587,370.00	<u>_</u>						2,587,370.0
Amortization	(347,866.00)	(18,028.00)	(42,028.00)	(98,553.00)	(41,081.00)	(68,819.00)	(79,357.00)	
Balance 12/31/94	11,970,593.05	432,665.00	1,050,693.88	2,562,385.90	1,109,193.27	1,926,944.00	2,301,341.00	2,587,370.0
Additions								
Additions Amortization	2,676,706.00	- (10.000.00)						
Balance 12/31/95	(434,112.00)	(18,028.00)	(42,028.00)	(98,553.00)	(41,081.00)	(68,819.00)	(79,357.00)	(86,246.0
Datance 1231/95	14,213,187.05	414,637.00	1,008,665.88	2,463,832.90	1,068,112.27	1,858,125.00	2,221,984.00	2,501,124.0
Additions	0.440.074.00							
Amortization	2,119,371.00	(10,000,00)	(10.000.00)					
Balance 12/31/96	(523,336.00) 15,809,222.05	(18,028.00)	(42,028.00)	(98,553.00)	(41,081.00)	(68,819.00)	(79,357.00)	(86,246.0
	10,000,222.03	390,009.00	966,637.88	2,365,279.90	1,027,031.27	1,789,306.00	2,142,627.00	2,414,878.0
Additions	1,538,664.00							
Amortization	(593,982.00)	(18,028.00)	(42,028.00)	(00 550 00)	(44 004 00)			
Balance 12/31/97	16,753,904.05	378,581.00	924,609.88	(98,553.00) 2,266,726.90	(41,081.00)	(68,819.00)	(79,357.00)	(86,246.0
	10,700,004,00	030,001.00	324,003.66	2,200,120.90	985,950.27	1,720,487.00	2,063,270.00	2,328,632.0
Additions	1,883,218.00					· · · · · · · · · · · · · · · · · · ·		
Amortization	(645,271.00)	(18,028.00)	(42,028.00)	(98,553.00)	(41,081.00)	(60 040 00)	/70 DET 00	
Balance 12/31/98	17,991,851.05	360,553.00	882,581.88	2,168,173.90	944,869.27	(68,819.00) 1,651,668.00	(79,357.00)	(86,246.0
			002 001:00	2,100,170.50	344,003.27	1,001,000.00	1,983,913.00	2,242,386.0
Additions	1,217,708.00							
Amortization	(708,045.00)	(18,028.00)	(42,028.00)	(98,553.00)	(41,081.00)	(68,819.00)	(79,357.00)	(86,246.00
Balance 12/31/99	18,501,514.05	342,525.00	840,553.88	2,069,620.90	903,788.27	1,582,849.00	1,904,556.00	2,156,140.00
						.,,,	-,~~7,~~U.VU	۵, ۱۰۰۰, ۱۹۷.۱۱
Additions	1,809,351.00							
Amortization	(748,635.00)	(18,028.00)	(42,028.00)	(98,553.00)	(41,081.00)	(68,819.00)	(79,357.00)	(86,246.00
Balance 12/31/00	19,562,230.05	324,497.00	798,525.88	1,971,067.90	862,707.27	1,514,030.00	1,825,199.00	2,069,894.00
								_,,_
Additions	2,328,892.41							
Amortization	(808,947.00)	(18,028.00)	(42,028.00)	(98,553.00)	(41,081.00)	(68,819.00)	(79,357.00)	(86,246.00
Balance 12/31/01	21,082,175.46	306,469.00	756,497.88	1,872,514.90	821,626.27	1,445,211.00	1,745,842.00	1.983,648.00
A _d_dist								
Additions	1,896,589.00	I						
Amortization	(882,136.00)	(18,028.00)	(42,028.00)	(98,553.00)	(41,081.00)	(68,819.00)	(79,357.00)	(86,246.00
Balance 12/31/02	22,096,628.46	288,441.00	714,469.88	1,773,961.90	780,545.27	1,376,392.00	1,666,485.00	1,897,402.00
A wildtate								
Additions	1,354,300.00							
Amortization	(945,356.00)	(18,028.00)	(42,028.00)	(98,553.00)	(41,081.00)	(68,819.00)	(79,357.00)	(86,246.00
97 PYE adj - addition	214.00				1			1
77 PYE adj - vint 1997 amort	(42,78)							
98 PYE adj - subtraction	(61,518.00)							
98 PYE adj - vint 1998 amort 90 PYE adj - subtraction	10,255.00							
v · · L auj • SUDUACUON	(133,483.00)	1	1					

#### CA-IR-88 DOCKET NO. 04-0113 PAGE 3 OF 45

HAWAIIAN ELECTRIC CO., I	NC.			1		PAGE 3	Or 43	
ACCUMULATED DEFERRE	STATE ITC	<del> </del>					<u> </u>	
ACCOUNT #255200	1							
	<del></del>	<u> </u>						
	(DR) / CR	62.0301%	62.0301%	62.0301%	62.0301%	62.0301%	61.0902%	64 00000
	TOTAL	1988	1989	1990	1991	1992	1993	61.0902% 1994
01 PYE adj - addition	43,497.00							
01 PYE adj - vint 2001 amort	(2,899.80)							
02 PYE adj - addition	80,053.00							
02 PYE adj - vint 2002 amort	(2,668.44)					]		
	I							
Balance 12/31/03	22,443,446.33	270,413.00	672,441.88	1,675,408.90	739,464,27	1,307,573,00	1,587,128,00	1,811,156.00
					, , , , , , ,	1,007,070.00	1,007,120.00	1,011,130.00
Additions	3,195,500.00							
03 PYE adj - addition	116,187.00							
03 PYE adj - vint 2003 amort	(3,888.60)							
Amortization	(992,564.00)	(18,028.00)	(42.028.00)	(98,553.00)	(41,081,00)	(60 940 00)	(70.057.05)	
Misc adjustment	(7.86)		(1-,-20.00)	(00,000.00)	(41,061.00)	(68,819.00)	(79,357.00)	(86,246.00)
8-1								
Balance 12/31/04	24,758,672.87	252,385.00	630,413.88	1,576,855.90	698,383.27	1,238,754.00	1,507,771.00	1,724,910.00
Additions	3,053,100.00					~		
Amortization	(1,102,954.00)	(46,000,00)	(10,000,000					
7 11101 52220013	(1,102,954.00)	(18,028.00)	(42,028.00)	(98,553.00)	(41,081.00)	(68,819.00)	(79,357.00)	(86,246.00)
Balance 12/31/05	26,708,818.87	234,357.00	588,385.88	1,478,302.90	657,302,27	4 400 005 00		
			000,000.00	1,470,302.30	057,302.27	1,169,935.00	1,428,414.00	1,638,664.00
		NOTE: For rate	e case purposes	s, accumulated d	eferred state IT	C (gross) is 1009	% of the actual s	tate ITC
		THE HELOTIAX &	imount is calcul	ated by multiplyir	or the cross am	ount by 62.0301	% (100% - 37.96	99%) for 1988
		and by 61,0902	% (100% - 38.9	098%) thereafter	-		, , , , , , , , , , , , , , , , , , , ,	.,555

CA-IR-88 DOCKET NO. 04-0113

HAWAIIAN ELECTRIC CO	, INC.	T	1		Į	PAGE 4	<del>42 43</del>	
ACCUMULATED DEFERE			<u> </u>		·			
ACCOUNT #255200	VIAIE IIV		<u> </u>	ļ	<u> </u>		.	
ACCOUNT #255200	<del></del>		<del> </del>	<del> </del>	<u> </u>		<u> </u>	
	/DB) / CB	61 00000/	64 66666	04.00000			<u> </u>	
	(DR) / CR	61.0902%	61.0902%	61.0902%	61.0902%	61.0902%	61.0902%	61.0902%
	TOTAL	1995	1996	1997	1998	1999	2000	2001
6 4 212								
Additions	540,833.00							
Amortization								
Balance 12/31/88	540,833.00							
Additions	1,260,833.88							
Amortization	(18,028.00)							<u> </u>
Balance 12/31/89	1,783,638.88							<u> </u>
Additions	2,948,915.90		I	1	1		<del> </del>	<del> </del>
Amortization	(60,056.00)							<del> </del>
89 PYE AJEs-additions	7,682.00			1	<u> </u>		<del> </del>	<del></del>
Balance 12/31/90	4,680,180.78						1	·   · · · · · · · · · · · · · · · · · ·
						· · · · · · · · · · · · · · · · · · ·	1	<del> </del>
Additions	1,232,436.27			<del>                                     </del>	<del> </del>		<del> </del>	-
Amortization	(158,609.00)		<u> </u>		<u> </u>		<del> </del>	<u> </u>
Balance 12/31/91	5,754,008.05		<u> </u>	<del>                                     </del>			<del>                                     </del>	- <del></del>
			<u> </u>	<del>                                     </del>			<b> </b>	<del>-</del>
Additions	2.064,582.00			<b></b>	<del> </del>		<u> </u>	ļ
Amortization	(199,690,00)		<del> </del>	<b>.</b>	-		<del> </del>	<b>_</b>
Balance 12/31/92	7,618,900.05		<u> </u>					
	7,010,300.03			<u> </u>	ļ		<u> </u>	
Additions	2,380,698.00						<u> </u>	
Amortization						ļ	<u> </u>	
Balance 12/31/93	(268,509.00)						<u> </u>	<u> </u>
Dalai Ce 12/31/93	9,731,089.05							
A abdition and								
Additions	2,587,370.00							
Amortization	(347,866.00)							
Balance 12/31/94	11,970,593.05							
							1	
Additions	2,676,706.00	2,676,706.00					[	
Amortization	(434,112.00)							
Balance 12/31/95	14,213,187.05	2,676,706.00						
							1	
Additions	2,119,371.00		2,119,371.00					
Amortization	(523,336.00)	(89,224.00)					1	†
Balance 12/31/96	15,809,222.05	2,587,482.00	2,119,371.00					1
								<del> </del>
Additions	1,538,664.00			1,538,664.00				
Amortization	(593,982.00)	(89,224.00)	(70,646,00)	,,				<del> </del>
Balance 12/31/97	16,753,904.05	2,498,258.00	2,048,725.00	1,538,664.00				<del>                                     </del>
Additions	1,883,218.00				1.883,218.00			
Amortization	(645,271.00)	(89,224.00)	(70,646,00)	(51,289.00)	1,000,210.00			<del> </del>
Balance 12/31/98	17,991,851.05	2,409,034.00	1,978,079.00	1,487,375.00	1,883,218.00			<del> </del>
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	_,,	.,0.0,0.00	.,-0,,0,0,00	7,000,210.00			
Additions	1,217,708.00					1 017 700 00		ļ
Amonization	(708,045.00)	(89,224.00)	(70,646.00)	(E1 000 00)	/60 774 66	1,217,708.00		
Balance 12/31/99	18,501,514.05	2,319,810.00	1,907,433.00	(51,289.00)	(62,774.00)	1 047 700 0		
	10,001,014.00	۵,510,610.00	1,501,433.00	1,436,086.00	1,820,444.00	1,217,708.00		
Additions	1 000 251 00							
	1,809,351.00	/00 co : c=					1,809,351.00	
Amortization Balance 12/31/00	(748,635.00)	(89,224.00)	(70,646.00)	(51,289.00)	(62,774.00)	(40,590.00)		
Dalatice 12/31/00	19,562,230.05	2,230,586.00	1,836,787.00	1,384,797.00	1,757,670.00	1,177,118.00	1,809,351.00	
A .1.57								
Additions	2,328,892.41							2,328,892.41
Amortization	(808,947.00)	(89,224.00)	(70,646.00)	(51,289.00)	(62,774.00)	(40,590.00)	(60,312.00)	
Rolonna 19/31/01	21_002 475 46	0 4 44 000 00 1	4 700 444 60					***************************************

#### CA-IR-88 DOCKET NO. 04-0113 PAGE 5 OF 45

HAWAIIAN ELECTRIC CO., I	NC.		· · · · · · · · · · · · · · · · · · ·	1		PAGE 5	JF 43	
ACCUMULATED DEFERRED	STATE ITC							
ACCOUNT #255200	1							
	(DR)/CR	61.0902%	61.0902%	61.0902%	61.0902%	61.0902%	24 2222	
	TOTAL	1995	1996	1997	1998	1999	61.0902%	61.0902%
		*****			1990	1999	2000	2001
01 PYE adj - addition	43,497.00							45 1
01 PYE adj - vint 2001 amort	(2,899.80)							43,497.00
02 PYE adj - addition	80,053.00							(2,899.80)
02 PYE adj - vint 2002 amort	(2,668,44)							
Balance 12/31/03	22,443,446.33	1.962,914,00	1,624,849.00	1,231,101.22	1,518,085.00	1.055.040.00	4 500 000 00	
			.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1,201,101.22	1,010,000.00	1,055,348.00	1,508,280.89	2,214,229.61
Additions	3,195,500.00							
03 PYE adj - addition	116,187.00							
03 PYE adj - vint 2003 amort	(3.888.60)							
Amortization	(992,564.00)	(89,224.00)	(70,646.00)	(E1 00C 00)	(22			
Misc adjustment	(7.86)	(50,224.00)	(10,040.00)	(51,296.00)	(60,723.00)	(40,590.00)	(55,862.00)	(79,080.00)
	31.00/							
Balance 12/31/04	24,758,672.87	1,873,690.00	1,554,203.00	1,179,805.22				
	- 1,7 - 0,10 / L.O.	1,070,030.00	1,004,200.00	1,179,605.22	1,457,362.00	1,014,758.00	1,452,418.89	2,135,149.61
Additions	3,053,100.00							
Amortization	(1,102,954.00)	(89,224.00)	(70,646.00)	(51,000,00)				
	(1,104,001.00)	(00,22,4.00)	(70,040.00)	(51,296.00)	(60,723.00)	(40,590.00)	(55,862.00)	(79,080.00)
Balance 12/31/05	26,708,818.87	1,784,456.00	1,483,557.00	1,128,509,22	4.000.000.00			
		1,701,300.00	1,400,007.00	1,120,509.22	1,396,639.00	974,168.00	1,396,556.89	2,056,069.61
		hrough 1992						
		111009111992						
					<u></u> į			

#### CA-IR-88 DOCKET NO. 04-0113 PAGE 6 OF 45

HAWAIIAN ELECTRIC CO	INC			- , ···	PAGE (	6 OF 45
ACCUMULATED DEFERR	ED STATE ITC	<del></del>				
ACCOUNT #255200			<del></del>		<u> </u>	
			<del></del>			
	(DR)/CR	61.0902%	61.0902%	61.0902%	61.0902%	Anaren Dad
	TOTAL	2002	2003	2004	2005	Accum Deferred State ITC
					2000	State II C
Additions	540,833.00	)				335,479.25
Amortization	-					000,475.20
Balance 12/31/88	540,833.00	)				335,479.25
Additions	1,260,833.88					782,096.52
Amortization	(18,028.00					(11,182.79
Balance 12/31/89	1,783,638.88					1,106,392.98
						1,100,002.00
Additions	2,948,915.90					1,829,215.48
Amortization	(60,056.00					(37,252.80
89 PYE AJEs-additions	7,682.00					4,765.15
Balance 12/31/90	4,680,180.78					2,903,120.81
B. 3 1743						
Additions	1,232,436.27					764,481.45
Amortization	(158,609.00					(98,385.32
Balance 12/31/91	5,754,008.05					3,569,216.94
Additions	2,064,582.00					1,280,662.28
Amortization	(199,690.00	<u></u>				(123,867.91
Balance 12/31/92	7,618,900.05					4,726,011.31
						1,120,011.01
Additions	2,380,698.00					1,454,373.17
Amortization	(268,509.00)					(166,556.40)
Balance 12/31/93	9,731,089.05				**	6,013,828.08
Additions	2,587,370.00				*****	1,580,629.51
Amortization	(347,866.00)					(215,035.75)
Balance 12/31/94	11,970,593.05					7,379,421.84
						.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Additions	2,676,706.00			1		1,635,205.05
Amortization	(434,112.00)					(267,723.61)
Balance 12/31/95	14,213,187.05				·····	8,746,903.28
					<del></del>	0,740,300.20
Additions	2,119,371.00	[		<b></b>		1,294,727.98
Amortization	(523,336.00)					(322,230.73)
Balance 12/31/96	15,809,222.05					9,719,400,53
						7,130,00
Additions	1,538,664.00			1		939,972.91
Amortization	(593,982.00)			1		(365,388.51)
Balance 12/31/97	16,753,904.05					10,293,984,93
						, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
Additions	1,883,218.00				-	1,150,461.64
Amortization	(645,271.00)					(396,721.06)
Balance 12/31/98	17,991,851.05				-	11,047,725.51
Additions	1,217,708.00					743,900.25
Amortization	(708,045.00)					(435,069.82)
Balance 12/31/99	18,501,514.05					11,356,555.94
• 1.174						
Additions	1,809,351.00					1,105,336.14
Amortization	(748,635.00)					(459,866.33)
Balance 12/31/00	19,562,230.05					12,002,025.75
Additions	2,328,892.41					1,422,725.03
Amortization	(808,947.00)					(496,711.06)
3alance 12/31/01	21,082,175.46					12,928,039.72
Additions	1,896,589.00	1,896,589.00			····	1,158,630.01
Amortization	(882,136.00)			I		(541,422.36)
Balance 12/31/02	22,096,628.46	1,896,589.00				13,545,247.37
Additions	1,354,300.00		1,354,300.00	-		827,344.58
Amortization	(945,356.00)	(63,220.00)				(580,043.59)
7 PYE adj - addition	214.00				·   -	130.73
7 PYE adj - vint 1997 amort	(42.78)					(26.13)
8 PYE adj - subtraction	(61,518.00)			-		(37,581.47)
8 PYE adj - vint 1998 amort	10,255.00					6,264.80
0 PYE adj - subtraction	(133,483.00)					(81,545.03)
0 PYE adj - vint 2000 amort	4,466.89					2,728.83

#### CA-IR-88 DOCKET NO. 04-0113 PAGE 7 OF 45

HAWAIIAN ELECTRIC CO., I	NC.	}	T	· · · · · · · · · · · · · · · · · · ·	PAGE 1	OF 45
ACCUMULATED DEFERRED	STATE ITC	<del> </del>				
ACCOUNT #255200	T T T T T T T T T T T T T T T T T T T					
	(DR) / CR	61.0902%	61.0902%	61.0902%	61.0902%	<del>                                     </del>
	TOTAL	2002	2003	2004	2005	Accum Deferred State ITC
Od FOUR					2003	State ITC
01 PYE adj - addition	43,497.00					00 570 40
01 PYE adj - vint 2001 amort	(2,899.80)					26,572.40
02 PYE adj - addition	80,053.00	80,053.00		<del>                                     </del>		(1,771.49
02 PYE adj - vint 2002 amort	(2,668,44)	(2,668.44)			<u> </u>	48,904.54
					<del>  </del>	(1,630.16)
Balance 12/31/03	22,443,446.33	1,910,753.56	1,354,300,00		<del> </del>	
			1,00 1,000.00	1		13,754,595.38
Additions	3,195,500,00			0 405 500 00		
03 PYE adj - addition	116,187.00		116,187,00	3,195,500.00		1,952,137.34
03 PYE adj - vint 2003 amort	(3,888.60)					70,978.87
Amortization	(992,564.00)	(65,888.00)	(3,888.60)			(2,375.55)
Misc adjustment	(7.86)	(00,000.00)	(45,143.00)			(608,883.05)
	(00.1)		(7.86)			(4.80)
Balance 12/31/04	24,758,672.87	1,844,865.56	1 404 447 54			
	C1,100,072.07	1,044,063.36	1,421,447.54	3,195,500.00		15,166,448.19
Additions	3,053,100.00					
Amortization	(1,102,954.00)	(65,888.00)	/// 0/ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		3,053,100.00	1,865,144.90
	(1,10E,334.00)	(00,000,00)	(49,016.00)	(106,517.00)		(676,320.52)
Balance 12/31/05	26,708,818,87	1,778,977,56	1 070 404 54			
	20,700,010.07	1,770,377,30	1,372,431.54	3,088,983.00	3,053,100.00	16,355,272.57
						T

FAG

OUTSIDE SERVICES AND PURCHASES

1988 12/22/88

# TTL

# TTL

36400

FOR STATE ITC CALCULATION (SELECTED COST TY IN2 END ACCT IN2\_AMOUNT 815,1**3**3.10- <sup>2</sup> \* TTL 10701 / -31110 \* TTL 3-996-067-16 31120 -5,689,05 \* TTL # TTL -31130 265 474 30 31210 1,863,919,99 \* TTL # TT]\_ 31220 939.617.36 31400 462,466.95 \* TTL # TTL 31500 49 587 79 24,183,787.3 + 3,996,063.16 -# TTL 31600 112,892.81 5,689.05 -\* TTL 34400 548.150.44 265,476.3 -1,489-2 -# TTL 34500 -107,426,66 5,138.84 -# TTL 1,489.20 109,399.62 -491 - 4 -\* TTL <del>-5.138.84</del> 1,794 -294 • 23 -# TT! 35300 882.136.63 1,770,184.16 -\* TTL 35400 239,135.11 18,027,767.34 \* 794.750.53 # TTL 35500 18,027,767.34 × \* TTL. 35510 145,187,66 35600 # TTL 194.087,27 1988 \* TTL. 35700 495.70 Hero State Capital Goods Excise Cr. # TTL 35900 48,348,40 35900 \* TTL 109.399.62 76910-<del>- 491</del> , 40 -M TTL # TTL + TTI 294,23 36200 148,024,80

2,294,367,96

#### CA-IR-88 DOCKET NO. 04-0113 PAGE 9 OF 45

12/22/88	IN2_END_ACCT	OUTSIDE SERVICES AND PU FOR STATE ITC CALCULA IN2_AMOUNT	RCHASES TION	PAGE
<del>)</del> : TTL	36410	186.682.04		
* TTL	36500	393,696,34		
# TTL	36600	2.849.581.06		
* TTL	36700	849.711.42		
# TTL	36800	2.782.853.05		
* TTL	3691 <b>0</b>	101.823.87		
+ TTL	36920	539.843.88		
* TTL	37000			
	STOOD SALL JOANA	495.262.22		
# TTL	W / Wann	1 <del>-770-180-16</del>		
* TTL	39110	1,521.63		
34 TTL	39120	168.367.90		
* TTL.	39130	242,465,49		
# TYL	39 <b>20</b> 0	625.299.49		
* TTL	39 <b>300</b>	4,152.00		
# TT1.	39410	13,296,67		
* TTL	39 <b>420</b>	171.381.25		
3: TT!	39540	257,459.15		
* TTL	ჳ <b>ჹ70</b> 0	219,887.45		
# TYL	3 <b>9800</b>	47.819.47		
		24.183.787.30	*** GRAND TO	TAL #

#### STATE OF HAWAII - DEPARTMENT OF TAXATION

FORM N-312 (REV. 1989)

# CAPITAL GOODS EXCISE TAX CREDIT

19<u>89</u>

SEE SEPARATE INSTRUCTIONS BEFORE COMPLETING THIS FORM.

Of itscal year beginning, 19, and ending	. 19
ATTACH THIS SCHEDULE TO FORM F-1, N-12, N-15, N-20, N-30, N-35, N-40, OR N-70NP.	SSN OR FEIN 99-0208097
Name Hawaiian Electric Industries, Inc. & Subsidiaries	Hawaii G.E./Use Ident. Number 10176418

- A. Was a deduction taken under Internal Revenue Code Section 179 (regarding an election to expense certain depreciable business assets) on any property listed on line 1?
- B. Was any property listed on line 1 acquired from a related company or person?
- C. Is any property listed on line 1 subject to the limitation on capital goods excise tax credit and the depreciation deduction under Internal Revenue Code Section 280F?
- D. Is any property listed on line 1 an integral part of a building or structure?
- E. Does any of the property listed on line 1 have a useful life of less than 3 years?

If you answered "Yes" to any question above, please attach an explanation as to how the qualifying basis was determined and identify the property involved on line 1, Part I using the applicable letter(s) for the descriptions above.

Yes	No	
	Χ	
	Х	
	Х	
	Х	
	Х	

PAR	T I COMPUTATION OF TAX CREDI	T			
(a) Description of Property – Attach a separate sheet if more space is needed		(b) Date property purchased or placed in	Cost of qualifying property acquired:		
		service, whichever is earlier	(c) After 12/31/87 and before 1/1/89	(d) After 12/31/88	
. Ha	waiian Electric Company, Inc.	Various 1989		31,540,997	
Ha	waii Electric Light Company, Inc			21,141,793	
Ma	ui Electric Company, Ltd.	11		13,509,994	
	CARRY FORWARD TO PREV Total qualifying cost of eligible property. Add a	C 31:540:997.00 × 0.04= 1:231:539:83*		66,192,784	
	Credit percentage		3%	4%	
	Multiply line 2 by line 3 and enter the result he				
	Amount of sales or use taxes paid to another s was claimed under section 238-3(i), Hawaii Re	1,231,639.88*+ 532.00 -			
i.	Line 4 minus line 5. Enter difference (not less t	1,405.00 -			
•	Capital Goods Excise Tax Credit - Combine ar Enter this amount here and on Form F-1, line 4 Sch. K, line 13; N-30, line 32d; N-35, Sch. K, lir line 5a; or N-70NP, line 16c	1,259,702.88 *	7		

#### FORM N-312 (REV. 1989)

PART II - RE	CAPTURE OF CAPITAL GOODS EXCISE TAX CRE	DIT
Name(s) as show Hawaiian E	vn on return. Electric Industries, Inc. & Subsidiaries	FEIN or SSN 99-0208097
Properties	Description of property. (Attach a separate sheet if mo	re space is needed.)
Α	1988 Vintage Eligible Property	
В	1989 Vintage Eligible Property	
С		
D		
E		

3% 1 3% 2 1988	4% 1989	С	D	E
1988	1989			
1989	1989			
1	0			
4,444	12,314			
0	0			
4,444	12,314			
66%	100%			
2,933	12,314	-		
3	1 1 5 4,444 65 0 4,444 68 66% 66% 2,933	1 0 5 4,444 12,314 6 0 0 7 4,444 12,314 8 66% 100% 9 2,933 12,314	1 0 0 5 4,444 12,314 66 0 0 0 7 4,444 12,314 66% 100% 12,314	1 0 4,444 12,314 6 0 0 7 4,444 12,314 8 66% 100%

Enter or include the amount on line 10 above on the appropriate form as indicated below:

Form F-1, line 40;

Form N-12, line 37;

Form N-15, line 40;

Form N-20, Schedule K, line 18;

Form N-30, Schedule J, line 18;

Form N-35, Schedule K, line 15;

Form N-40, line 23; or

Form N-70NP, line 11.

HAWAIIAN ELECTRIC INDUSTRIES, INC. AND SUBSIDIARIES RECAPTURE OF CAPITAL GOODS EXCISE TAX CREDIT YEAR ENDED DECEMBER 31, 1989

""''AII #10176418

	Hawaiian Electric Company, Inc.	Hawaii Electric Light Company, Inc.		CONSOLIDATED
1. Original Rate of Credit	3%	3%	3%	3%
2. Date Recapture Period Begins	1988	1988	1988	1988
3. Date Property Not Eligible	1989	1989	1989	1989
4. Number of full years				
between dates on line 2 & 3	1	1	1	1
<ol><li>Original Credit Claimed</li></ol>	806	3,401	237	4,444
6. Recomputed Credit	0	0	0	0
7. Decrease in Credit	806	3,401	237	4,444
8. Recapture Percentage	66%	66%	66%	66%
9. Recapture Tax	532	2,245	156	2,933
1. Original Rate of Credit	3%	4%		4%
2. Date Recapture Period Begins	1989	1989		1989
3. Date Property Not Eligible	1989	1989		1989
4. Number of full years				
between dates on line 2 & 3	0	0		0
<ol><li>Original Credit Claimed</li></ol>	1,405	10,909		12,314
6. Recomputed Credit	0	0		0
<ol><li>Decrease in Credit</li></ol>	1,405	10,909		12,314
<ol><li>Recapture Percentage</li></ol>	100%	100%		100%
9. Recapture Tax	1,405	10 <b>,9</b> 09		12,314
				==========
11. Total Increase in Tax				15,247

#### STATE OF HAWAII - DEPARTMENT OF TAXATION

**FORM** 

# CAPITAL GOODS

N-312 (REV. 1990)	SEE SEPARATE INSTRUCTION	IAX UKEU NS BEFORE COMPLETIN		М.		19 9 0
ŕ	Or fiscal year beginning					
ATTACH THIS SCHE	DULE TO FORM F-1, N-12, N-15, N-20, N-3	0, N-35, N-40, OR N-70NP.	SSN O	R FEIN		
Name Hawaiian Elec	etric Industries, Inc. & Subsic	liaries	Hawaii		Jse ide	nt. Number
the clos	for the credit, including an amended classe of the taxable year for which the credithe time for claiming the credit.	aim, must be filed on or be dit may be claimed. An ext	fore the end tension of tin	of the ne for	twelfti filing	n month following a return does not
PART I COM	PUTATION OF TAX CREDIT					
	(a) Description of Property - Attach a separate sheet if more space is needed		(b) Date prope urchased or pla service, whichev earlier	ced in	(c	Cost of qualifying property
	ectric Industries, Inc.		Various 1	990		172,450
	ectric Renewable Systems, Inc.				-	39,691
Lalamilo Ver	fic Corporation				<u> </u>	15,537 24,393
HEI Diversi			11		1	7,325
	g & Barge Corp.		1:			3,990,475
Young Broth			11			5,120,583
	ance Agency, Inc.		11		ļ	6,328
	Mortgage, Inc.		11		-	2,235
	ectric Company, Inc.					73,744,947 10,836,476
	tric Light Company, Inc.		t i		<del> </del>	8,512,130
Hadi LICCLI	re company, etc.			··.··	1	<u> </u>
		0.	*0			
		0.	*·		<del> </del>	
2. Total qualifying co	ost of eligible property. Add amounts in colum	73,744,947.00		. 2	1	02,472,570
3. Credit percentag	9	0 • 0 4		3		4%
3. Gredit percentag	<del> </del>	2,949,797.88	*			
4. Multiply line 2 by	line 3 and enter the result here			4	-	4,098,902
	or use taxes paid to another state or jurisdictic er section 238-3(i), Hawaii Revised Statutes.		,	5		
•	cise Tax Credit - Line 4 minus line 5. Enter di	2,949,797.83	*+	***************************************		
	t here and on Form F-1, line 45; N-12, line 56; 13b; N-40, line 27b (or Schedules K-1, line 8	528.00	ne 32d; 	6		4,098,902
14-00, Oct. 11, III.	too, it to, and and for denodered it i, and d	343.00				
		11.00				
		2,943,915.88		Yes	No	
	Was a deduction taken under Internal I expense certain depreciable business	5,940,810.00	ction to		Х	
	B. Was any property listed on line 1 acquired f	from a related company or persor	1?		χ	
N. T.	Is any property listed on line 1 subject to the and the depreciation deduction under International Control of the Control	nal Revenue Code Section 280F?			х	
	D. Is any property listed on line 1 an integral p	eart of a building or structure?			X	
	E. Does any of the property listed on line 1 ha	ve a useful life of less than 3 yea	rs?		Y	

If you answered "Yes" to any question above, please attach an explanation as to how the qualifying basis was determined and identify the property involved on line 1, Part I using the applicable letter(s) for the description above.

31

FOR	M
N-31	2
(REV.	19901

Name(s) as shown Hawaiian E	lectric Industries	, In	c. & Subsi	diaries	FEIN or 99-0	SSN )208097	
Properties	Description of pro		· · · · · · · · · · · · · · · · · · ·				<i>ત</i> \
-							
····							
<del></del>	•						
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	<b>*</b> ,						
	•••						
	1020 V:						
В	1989 Vinta	nge E	ligible Pro	operty			
B C	1989 Vinta 1990 Vintage E						
C D							
С							
C D					Properties		
C D E	1990 Vintage E				Properties C	D	E
C D E	1990 Vintage E		ble Proper	ty B	С	D	E
C D E RECAPTURE CO (See Specific	1990 Vintage E	Zligi	ble Proper	ty		D	E

HAWAIIAN ELECTRIC INDUSTRIES, INC. AND SUBSIDIARIES FEIN: 99-0208097 RECAPTURE OF CAPITAL GOODS EXCISE TAX CREDIT YEAR ENDED DECEMBER 31, 1990

HAWAII #10176418

	Hawaiian Electric Industries, Inc.	Hawaiian Electric Company, Inc.	Hawaii Electric Light Company, Inc.	Maui Electric Company, Limited	CONSOLIDATED
1. Original Rate of Credit		3%	3%	3%	3%
2. Date Recapture Period Begins		1988	1988	1988	1988
3. Date Property Not Eligible		1990	1990	1990	1990
<ol> <li>Number of full years</li> </ol>					
between dates on line 2 & 3		2	2	2	2
<ol><li>Original Credit Claimed</li></ol>		1,599	1,988	141	3,728
<ol><li>Recomputed Credit</li></ol>		0	0	0	Ö
<ol><li>Decrease in Credit</li></ol>		1,599	1,988	141	3,728
<ol><li>Recapture Percentage</li></ol>		33%	33%	33%	33%
9. Recapture Tax		528	656	46	1,230
					==========
1. Original Rate of Credit	4%	4%	4%	4%	4%
<ol><li>Date Recapture Period Begins</li></ol>	1989	1989	1989	1989	1989
<ol><li>Date Property Not Eligible</li></ol>	1990	1990	1990	1990	1990
4. Number of full years					
between dates on line 2 & 3	1	1	1	1	1
<ol><li>Original Credit Claimed</li></ol>	107	520	6,511	75	7,213
6. Recomputed Credit	0	0	0	Đ	0
7. Decrease in Credit	107	520	6,511	75	7,213
8. Recapture Percentage	66%	66%	66%	66%	66%
9. Recapture Tax	71	343	4,297	50	4,761
					******
1. Original Rate of Credit		4%	4%		4%
2. Date Recapture Period Begins		1990	1990		1990
<ol><li>Date Property Not Eligible</li></ol>		1990	1990		1990
4. Number of full years					
between dates on line 2 & 3		0	0		0
<ol><li>Original Credit Claimed</li></ol>		11	11,556		11,567
<ol><li>Recomputed Credit</li></ol>		0	Ò		0
<ol><li>7. Decrease in Credit</li></ol>		11	11,556		11,567
Recapture Percentage		100%	100%		100%
Recapture Tax		11	11,556		11,567
					******
10, Total Increase in Tax					17,558

STATE OF HAWAII — DEPARTMENT OF TAXATION

# **CAPITAL GOODS**

FORM N-312 (REV. 1991)		CISE TAX CF			S FORM	A.	19 <sub>9</sub> 1
	Or fiscal year beginning	, 19, and endi	ng		, 19		, , , , , , , , , , , , , , , , , , ,
	ULE TO FORM F-1, N-12, N-15,	N-20, N-35, N-40, OR N-70NP.	•	ss	N OR FEI 99-02		
Name	lectric Industries, I	nc & Subsidiaries		На			ent, Number
CAUTION: A claim fo close of th	r the credit, including an ame the taxable year for which the calming the credit.	nded claim, must be filed on o	or befo tension	ore the end of	10176 If the twe filing a re	Ifth mo	nth following the ses not extend the
PARTI COMPUTA	ATION OF TAX CREDIT		,				
	(a) Description of Property — separate sheet if more space			purchased service, w	property or placed in hichever is dier	7	(c) Cost of qualifying property
	tric Industries, Inc.			Vario	us 199	T	429,800
Lalamilo Vent	ures, Inc.	. Inc			11		16,770
	tric Renewable System	s, Inc.		11			24,275
Hawaiian Tuq Young Brother				<del>                                     </del>	11		1,038,664 8,306,268
HEL Diversifi				1	- 11		6,460
Malama Mohala	Corp - From N-312A			11	11	-	128
Malama Pacifi				1:	-11		24,625
	tric Company, Inc.			11	11		30,845,482
<u> Hawaii Electr</u>	ic Light Company, Inc			FI	1.1		10,062,048
	Company, Ltd.				7.7		4,033,050
Associated Mo	rtgage, Inc.			11	11		3,588
American Savi ASB Service C	ngs Investment Service	es Corporation		11	11		1,176
A36 SELVICE C	Of por ac ron	***************************************		ļ'	**	·	987
				<del>                                     </del>			
· • •	eligible property. Add amounts in		C	ites, trusts,		2	54,793,321
3. Credit percentage		30,845,432.00	х	*****		3	4%
		0.04					
• • •	and enter the result here	1,233,819.28	*			•	2,191,733
	taxes paid to another state or ju	1,533,013,50	•••	section 238-3(i)	.		
	es. (see instructions)			***************************************		5	
	Tax Credit — Line 4 minus line 5 and on Form F-1, line 47; N-12,				l		
	DNP, line 16(d)				١.	,	2,191,733
* * * * * * * * * * * * * * * * * * * *		1,233,819,28	* +	1		<u></u>	
		1,269.00	_		T.		
A	. Was a deduction taken under	82.00		an election to	Yes	No	
	expense certain depreciable b			?		Х	
	. Was any property listed on line	32•00		1		х	
С	is any property listed on line 1 and the depreciation deduction	1 • 232 • 436 • 28	涔	tax credit	Χ×		
D	. Is any property listed on line 1	wanter of Subcruft	e?			х	
E	. Does any of the property listed on	line 1 have a useful life of less than	3 years	i?		Х	
	If you answered "Yes" to any ques	tion above, piease attach an explan	ation as	to how the		^_	•

qualifying basis was determined and identify the property involved on line 1. Part I using the applicable letter(s) for the description above.

**FORM N-312** 

#### FORM N-312 (REV. 1991)

	CAPTURE OF CAPITAL	GOC	DDS EXCISE	TAX CREDIT						
Name(s) as shown o Hawaiian E	n return. Nectric Industries, I	nc.	& Subsidiar	ies	FEIN or SSN 99-020	8097				
Properties	Description of	Description of property. (Attach a separate sheet if more space is needed.)								
Α	Hawaiian Electric I	Hawaiian Electric Industries - 1989 Eligible Property								
В	Lalamilo Ventures,	Inc	1989 Eli	gible Prope	rty					
С	Hawaiian Electric (	Omp	any, Inc. –	1989 Eligib	le Property					
D		Hawaiian Electric Company, Inc 1990 Eligible Property								
E	Hawaiian Electric (	omp	any, Inc	1991 Eligib	le Property					
	Properties									
RECAPTURE CO (See Specific Ins	•	1	<b>A</b> 4%	B 4%	C 4%	<b>D</b>	<b>E</b> 4%			
2. Date recaptor (see Instruction	ure period begins tions)	2	1989	1989	1989	1990	1991			
capital good property. (se	ty ceased to be eligible ls excise tax credit ee Instructions)	3	1991	1991	1991	1991	1991			
date on line	ull years between the 2 and the date on line 3	4	2	2	2	1	0			
credit claime	previously recomputed ed. (see Instructions)	5_	584	454	3,845	124	32			
<ol><li>Decrease in</li></ol>	d credit. (see Instructions) credit due to disposition. s line 6.)	6 7	0 584	0 454	3,845	0 124	<u>0</u> 32			
8. Recapture p	percentage. (from	8	33%	33%	33%	66%	100%			
by line 8.)	ax. (line 7 multiplied	9	193	150	1,269	82	32			
10. Total increa	se in tax. (add line 9		na annonninta fa				1 726			

A. Was a decluction taken under internal Revenue Code Section 179 (regarding an election to Marka in an area concerning to the first marka in same under internal Revenue Code Section 179 (regarding an election to Marka in and the first internal internal Revenue Code Section 179 (regarding an election to Marka in Electric Industrials and election to Marka in Electric Company, Inc. 1992 2, 164, 265 (1992) 37,525,12  1. Total qualitying cost of eligible property. Add amounts in and cooperatives, see instructions) 2, 059, 677, 00 * 139, 808, 47	N-312 (REV. 1992)	SEE SEPARATE INST	TRUCTIONS BEFORE COMPL	ETING THIS FO		19 9 2
Hawaii an Electric Industries, Inc. and Subsidiaries  Hawaii GE/Use joint. Number 10176418  CAUTION: A claim for this credit, including an amended claim. must be filed on or before the end of the twelfth month following the close of taxable year for which the credit may be claimed. An extension of time for filing a return does not extend the time for claiming credit. The taxableyer shall treat the amount of the credit allowable and claimed as a taxable income term for the taxable year in it is properly recognized under the embtool of accounting used to compute taxable income. Alternatively, the basis of eligible property for depreciation purposes for State income taxes shall be reduced by the amount of the credit allowable and claimed.  PARTI COMPUTATION OF TAX CREDIT  (a) Description of Property — Attach a separate shreef if more space is needed  (b) Date property purchased or placed in service, whichever is earlier.  (c) Cost of qualifications are claimed. In the credit allowable and claimed as a taxable income term for the taxable year in its property purchased or placed in service, whichever is earlier.  (a) Description of Property — Attach a separate shreef if more space is needed  (b) Date property purchased or placed in service, whichever is earlier.  (c) Cost of qualifications are claimed as a taxable income term for the taxable year in the service, whichever is earlier.  (c) Cost of qualifications are claimed in service, whichever is earlier.  (d) Date property purchased or placed in service, whichever is earlier.  (e) Cost of qualifications are claimed in service, whichever is earlier.  (d) Date property purchased or placed in service, whichever is earlier.  (e) Cost of qualifications are claimed in service, whichever is earlier.  (c) Cost of qualifications are claimed in service, whichever is earlier.  (c) Cost of qualifications.  (d) Date property purchased or placed in service, whichever is earlier.  (e) Cost of qualifications.  (c) Cost of qualifications.  (c) Cost of qualifications.  (d) Date pro		Or fiscal year beginning	19 and ending _	····	19	J
Hawai ian Electric Industries, Inc. and Subsidiaries  Part Industries including an amended claim. must be filed on or before the end of the twelfth month following the close of taxable year for which the credit may be claimed. An extension of time for filing a return does not extend the time for claiming credit. The taxable year shall treat the amount of the credit allowable and claimed as a taxable income taxe time for the taxable year in it is properly recognized under the method of accounting used to compute taxable income taxes of eligible property for depreciation purposes for State income taxes shall be reduced by the amount of the credit allowable and claimed.  PART I COMPUTATION OF TAX CREDIT  (a) Description of Property — Attach is separate sheel if more space is needed  (a) Description of Property — Attach is separate sheel if more space is needed  (b) Date property purchased or placed in service and purchased in service and purchased or placed in service and purchased or	ATTACH THIS SCHED	DULE TO FORM F-1, N-12, N-15, N-20, I	N-35. N-40, OR N-70NP	SSN	OR FEIN 19-0208	1097
CAUTION: A claim for this credit, including an amended claim, must be filed on or before the end of the twelth month following the close of taxable year for which the credit may be claimed. An extension of time for filing a return does not extend the time for claiming credit. The taxable year shall threat the amount of the credit allowable and claimed as a taxable income item for the taxable year in it is properly recognized under the method of accounting used to compute taxable income. Alternatively, the basis of eligible property for depreciation purposes for State income taxes shall be reduced by the amount of the credit allowable and claimed.  PARTI COMPUTATION OF TAX CREDIT  (a) Description of Property — Attach is separate sheet if more space is needed  (a) Description of Property — Attach is separate sheet if more space is needed  (b) Date property purchased or placed in service, whichever is earlier with a service. Whichever is earlier with a service whichever is earlier with a service. Whichever is earlier with a service whichever is earlier with a service. Whichever is earlier with a service whichever is earlier with a service. Whichever is earlier with a service whichever is earlier with a service. Whichever is earlier with a service whichever is earlier with a service. Whichever is earlier with a service whichever is earlier with a service. Whichever is earlier with a service whichever is earlier with a service. Whichever is earlier with a service whichever is earlier with a service. Whichever is earlier with a service whichever is earlier with a service whichever is earlier with a service. Whichever is earlier with a service whichever is earlier with a service whichever is earlier with a service. Whichever is earlier with a service whichever is earlier with a service. Whichever is earlier with a service whichever is earlier with a service whichever is earlier with a service whichever is earlie						
credit. The taxpayer shall treat the amount of the credit allowable and claimed as a taxable income item for the taxable year in it is properly recognized under the method of accounting used to compute taxable income. Alternatively, the basis of eligible properly for depreciation purposes for State income taxes shall be reduced by the amount of the credit allowable and claimed.  **PARTI COMPUTATION OF TAX CREDIT**  (a) Description of Property — Attach a separate sheet if more space to needed  (b) Date property purchased or placed in service, whichever is earlier.  (c) Cost of qualified property. Hawai ian Electric Industries, inc.  1992 1,719.88  Hawai ian Electric Lindustries, inc.  1992 1,719.88  Hawai ian Tuq and Barge Corp.  1992 2,063,56  Malaima Pacific Corp.  1992 5,741,92  Awai i Electric Light Company, Inc.  1992 46,266,85  Maui Electric Company, Ltd.  1992 37,525,12   O **C  51,741,925.00 ×  0 **C  51,941,925.00 ×  0 **C  51,941,925.00 ×  0 **C  51,941,925.00 ×  0 **C  51,941,925.00 ×  0 **C  10,941,925.00 ×  10,941				1	017641	8
(a) Description of Property — Attach a separate sheet if more space is needed  (b) Date property purchased or placed in service. Whichever is earlier to purchase or placed in property.  (c) Cost of qual property. Hawaii an Electric Industries, Inc.  1992 489,02 489,02 1,719,88 Hawaii an Tug and Barge Corp. 1992 2,063,76 Malama Pacific Corp. 1992 2,16 Hawaii Electric Company, Inc. 1992 151,741,925 Hawaii Electric Light Company, Inc. 1992 37,525,12  0 • *C  51,741,925 · OO × 0 · D4 = 2,053,677 · OO *  10 · *C  10 · *C  11 · *C  12 · *C  13 · *C  13 · *C  13 · *C  14 · *C  14 · *C  15 · *C  15 · *C  16 · *C  17 · *C  17 · *C  18 · *C  19 · *C  10 · *C  10 · *C  10 · *C  10 · *C  11 · *C  12 · *C  13 · *C  13 · *C  14 · *C  15 · *C  15 · *C  16 · *C  17 · *C  17 · *C  17 · *C  18 · *C  18 · *C  19 · *C  10 · *C  11 · *C  11 · *C  12 · *C  13 · *C  14 · *C  13 · *C  14 · *C  14 · *C  15 · *C  16 · *C  17 · *C  17 · *C  17 · *C  18 · *C  18 · *C  18 · *C  19	credit. T it is prop property	he taxpayer shall treat the amount of erly recognized under the method of for depreciation purposes for State in	if the credit allowable and claimed a	a return does not on a return does not on the same a return does not on the same area.	extend the item for	e time for claiming the the taxable year in whi
Young Brothers, Ltd.  Hawaiian Tuq and Barge Corp.  Halama Pacific Corp.  Hawaiian Electric Company, Inc.  Hawaii Electric Light Company, Inc.  Hawaii Electric Company, Ltd.  1992  2, 163, 50  1992  2, 16  1992  2, 16  1992  37, 525, 12   0 • **C		(a) Description of Property— separate sheet if more space	- Attach a is needed	purchased o service, whi	r placed in chever is	(o) don or dominating
Hawaiian Tuq and Barge Corp.   1992   2,063,550   1992   2,063,550   1992   2,163,563   1992   2,163,563   1992   2,164,266,853   1992   37,525,12   1992   37,525,	. Hawaiian E	lectric Industries, Inc.		199	2	489,025
Mailama Pacific Corp.  Hawaiian Electric Company, Inc.  Hawaii Electric Light Company, Inc.  Maui Electric Company, Ltd.  1992  37,525,12  0 **C  51,741,925.00 ×  0 .04=  2,059,677.00*  Total qualifying cost of eligible propeny. Add amounts and cooperatives, see instructions).  Tax credit percentage. (Enter 4% for taxable years end beginning after December 31, 1992, see the "NOTE" in Section 238-3(i), Hawaii Revised Statutes. (see Instruct Capital Goods Excise Tax Credit — Line 4 mirrus line 5, and on Form F-1, kine 46; N-12, line 56; N-15, line 43e:1	Hawaiian T	ers, Ltd.				1,719,881
Hawaii an Electric Company, Inc.  Hawaii Electric Light Company, Inc.  Maui Electric Company, Ltd.  O**C  51,741,925.00 ×  0.04=  2,059,677.00*  Total qualifying cost of eligible property. Add amounts is and cooperatives, see instructions)  Tax credit percentage. (Enter 4% for taxable years end beginning after December 31, 1992, see the "NOTE" in  Amount of sales or use taxes paid to another state or jussection 238-3(), Hawaii Revised Statutes. (see Instruct Capital Goods Excise Tax Credit — Line 4 minus line 5, and on Form F-1, line 46; N-12, line 56; N-15, line 43e; I	Malama Paci	ific Corp				2,063,506
Hawaii Electric Light Company, Inc.  Maul Electric Company, Ltd.  1992  37,525,12  0 **C  51,741,925.00 ×  0 .04 =  2,059,677.00 *  Total qualifying cost of eligible property. Add amounts is and cooperatives, see instructions)  Tax credit percentage. (Enter 4% for taxable years end beginning after December 31, 1992, see the "NOTE" in  Amount of sales or use taxes paid to another state or just section 238-3(i), Hawaii Revised Statutes. (see Instruct Capital Goods Excise Tax Credit — Line 4 minus line 5, and on Form F-1, line 46; N-12, line 56; N-15, line 43e; line 5	Hawaiian Fi	lectric Company lea				2,161
Mau i Electric Company, Ltd.  1992 37,525,12  0 **C  51,741,925.00 ×  0 .04=  2,059,677.00*  Total qualifying cost of eligible property. Add amounts and cooperatives, see instructions)  Tax credit percentage. (Enter 4% for taxable years end beginning after December 31, 1992, see the "NOTE" in  Amount of sales or use taxes paid to another state or jused conditions or use taxes taxes trusts.  2 139,808,47	Hawaii Elec	tric light Company Inc.				51,741,925
Total qualifying cost of eligible property. Add amounts is and cooperatives, see Instructions)  Tax credit percentage. (Enter 4% for taxable years end beginning after December 31, 1992, see the "NOTE" in Amount of sales or use taxes paid to another state or justice section 238-3(i). Hawaii Revised Statutes. (see Instruct Capital Goods Excise Tax Credit — Line 4 minus line 5. and on Form F-1, line 46: N-12, line 56: N-15, line 43e:  O • *C  51, 741, 925 • 00 ×  0 • 04 =  2, 059, 677 • 00 *  \$ states, trusts.  2 139,808,47  5 095 • 00 -  2, 069, 677 • 00 *  \$ 5,592,33:  A. Was a deduction taken under internal Revenue Code Section 179 (recording to the first amount here ine 16(d)	Maui Electr	ic Company Itd				
51,741,925.00 × 0.04= 2,059,677.00*  Total qualifying cost of eligible property. Add amounts is and cooperatives, see instructions)				199		37,525,125
Total qualifying cost of eligible property. Add amounts and cooperatives, see Instructions)  Tax credit percentage. (Enter 4% for taxable years end beginning after December 31, 1992, see the "NOTE" in  Multiply line 2 by line 3 and enter result here  Amount of sales or use taxes paid to another state or julused section 238-3(i), Hawaii Revised Statutes. (see Instruct Capital Goods Excise Tax Credit — Line 4 minus line 5. and on Form F-1, line 46: N-12, line 56: N-15, line 43e:  Total qualifying cost of eligible property. Add amounts at states, trusts.  2 139,808,47  5 2/069/677.00*+  5 3 4%  5,592,33:  2/064/532.00 *  None  Test No  Yes No			0 • *C			
Total qualifying cost of eligible property. Add amounts and cooperatives, see Instructions)  Tax credit percentage. (Enter 4% for taxable years end beginning after December 31, 1992, see the "NOTE" in  Multiply line 2 by line 3 and enter result here  Amount of sales or use taxes paid to another state or julused section 238-3(i), Hawaii Revised Statutes. (see Instruct Capital Goods Excise Tax Credit — Line 4 minus line 5. and on Form F-1, line 46: N-12, line 56: N-15, line 43e:  Total qualifying cost of eligible property. Add amounts at states, trusts.  2 139,808,47  5 2/069/677.00*+  5 3 4%  5,592,33:  2/064/532.00 *  None  Test No  Yes No						
Total qualifying cost of eligible property. Add amounts is and cooperatives, see instructions)						
Total qualifying cost of eligible property. Add amounts is and cooperatives, see Instructions)			0 • 0 4 =			
and cooperatives, see Instructions)			2,039,677.00*			
Tax credit percentage. (Enter 4% for taxable years end beginning after December 31, 1992, see the "NOTE" in 2,059,577.00%+  Multiply line 2 by line 3 and enter result here	Total qualifying cos	at of eligible property. Add amounts is		states, trusts.		
beginning after December 31, 1992, see the "NOTE" in  2 / US3 / S77 · UU * +  Multiply line 2 by line 3 and enter result here	Tax credit percenta	ige. (Enter 4% for taxable years and			2	139,808,474
Amount of sales or use taxes paid to another state or jul 2 2 0 3 4 2 5 3 2 • 0 0 *    section 238-3(i), Hawaii Revised Statutes. (see Instruct  Capital Goods Excise Tax Credit — Line 4 minus line 5. and on Form F-1, line 46; N-12, line 56; N-15, line 43e;   5 No  A. Was a deduction taken under Internal Revenue Code Section 179 (seconding of the line 18).	beginning after Dec	cember 31, 1992, see the "NOTE" in	2,069,677.00*+	_	3	4%
Amount of sales or use taxes paid to another state or jul 2 2 0 3 4 2 5 3 2 • 0 0 *  section 238-3(i), Hawaii Revised Statutes. (see Instruct  Capital Goods Excise Tax Credit — Line 4 minus line 5. and on Form F-1, line 46; N-12, line 56; N-15, line 43e;   5   5,592,339  A. Was a deduction taken under Internal Revenue Code Section 179 (seconding or line)	. Multiply line 2 by lin	e 3 and enter result here	5:095:00 -		Ī	E 500 330
section 238-3(i), Hawaii Revised Statutes. (see Instruct  Capital Goods Excise Tax Credit — Line 4 minus line 5. and on Form F-1, line 46; N-12, line 56; N-15, line 43e;  A. Was a deduction taken under Internal Revenue Code Section 179 (seconding on the section 179) (seconding on the seconding on the section 179) (seconding on the seconding of the seconding on the seconding of th	Amount of sales or	use taxes paid to another state or iu	· · ·	*************	4	2,534,539
Capital Goods Excise Tax Credit — Line 4 minus line 5. and on Form F-1, line 46; N-12, line 56; N-15, line 43e;  A. Was a deduction taken under Internal Revenue Code Section 179 (recording to a label)	section 238-3(i), He	twaii Revised Statutes. (see Instruct				None
A. Was a deduction taken under Internal Revenue Code Section 179 (recording on plants)	Capital Goods Exci	se Tax Credit Line 4 minus line 5.		hic armount horn	5	none
A. Was a deduction taken under Internal Revenue Code Section 179 (recording on all the section 179)	and on Form F-1, is	ne 46; N-12, line 56; N-15, line 43e;			6	5,592,339
A. Was a deduction taken under Internal Revenue Code Section 179 (recording on all the section 179)						. 1
expense certain depreciable business assets) on any property beand as the control to	A.	Was a deduction taken under Internal R	levenue Code Section 179 transmins as	section to	Tes	10
- 1 Annual annual annual annual bucharith signal cut state 1 ( V )		expense certain depreciable business a	ssets) on any property listed on line 1?	· e-e-chori (O		x

	-				
-	·				
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	<u> </u>				
P					
		-			

#### FORM N-312 (REV. 1982)

ene(s) as shown o Hawaiian	nretum. Electric Industries	, Inc. and Subsi	diaries	FE	N or SSN 99-0208	3097	
Properties	Description of	of property. (Attach a separate sheet if more space is needed.)					
Α	Malama Pacific Cor						
В	Hawaiian Electric	Company, Inc.					
С	Hawaii Electric Li						
D	Maui Electric Comp						
E							
				Properties			
ECAPTURE CO	OMPUTATION:	Α	В	С	D	E	
	f <b>credi</b> t (3%, 4%, or 4.5%)	Various	Various	Various	Various		
Date recapture	Date recapture period begins (see Instructions)	2	11	11	11	<del> </del>	
Date property	ceased to be eligible						

#### STATE OF HAWAII--DEPARTMENT OF TAXATION

## CAPITAL GOODS EXCISE TAX CREDIT

FORM N-312 (REV. 1993)		E IAX CHED CTIONS BEFORE COMPLETIN		IS FORM		<b>19</b> <sup>9</sup> <sup>3</sup>
,	Or fiscal year beginning	, 19, and ending			, 19	-
ATTACH THIS SCHEE	ULE TO FORM F-1, N-12, N-15, N-20, N-30,	N-35, N-40, OR N-70NP		SSN OR F	EIN 020809	7
Name Hawaiia	n Electric Industries, Inc.	and Subsidiaries			E./Use ld: 76418	ant. Number
taxable y credit. I it is prop	for this credit, including an amended claim year for which the credit may be claimed. The taxpayer shall treat the amount of the verty recognized under the method of acci- for depreciation purposes for State incom-	An extension of time for filing a ret credit allowable and claimed as a t punting used to compute taxable in	um do axabie come.	es not exte income ite Alternative	nd the ti im for the ily, the b	me for claiming the e taxable year in which asis of eligible
PARTI COMPU	TATION OF TAX CREDIT					
	(a) Description of Property — Atta separate sheet if more space is n		pure	<ul> <li>Date prop chased or pia rvice, whiche earlier</li> </ul>	ced in	(c) Cost of qualifying property
	n Electric Industries, Inc.	ē		1993		77,960
	n Electric Company, Inc.			1993		59,584,715
	Electric Light Company, Inc.			1993		19,184,490
Maui El	ectric Company, Ltd.			1993		47,236,838
Young 8	rothers, Ltd.			1993	l	1,821,331
Hawaiia	n Tug & Barge Corp.			1993		124,671
Ma I ama	Pacific Corp.			1993		2,725
			_			
		4	a <u> </u>			
			_			
		59,534,715.00 >	ί _			
		0.04=				
2. Total qualifying o	ost of eligible property. Add amounts in co	2,333,388.60*	. tr	rusts,		100 020 720
and cooperatives	, see instructions)	2/353/305-00*		a	2	128,032,730
3. Tax credit percen	rtage			*********	3	4%
						5,121,309
4. Multiply line 2 by	line 3 and enter result here			************	4	5,141,309
5. Amount of sales	or use taxes paid to another state or jurisd	2,333,333.60*	ř-			
section 238-3(i),	Hawaii Revised Statutes. (see instruction:	2,691.00 -	<u>.</u>	**************	5	
	ccise Tax Credit — Line 4 minus line 5. El		200	unt here		E 193 200
and on Form F-1	, line 46; N-12, line 56; N-15, line 43e; N-3	2,380,697.60 >	° ¥e	)	6_	5,121,309
			-			
				Γ	Yes N	0
A	Was a deduction taken under Internal Rev	enue Code Section 179 (recenting an e	lection	to I		
•	expense certain depreciable business ass				;	<u> </u>
				ľ		I

- B. Was any property listed on line 1 acquired from a related company or person?
- C. Is any property listed on line 1 subject to the limitation on capital goods excise tax credit and the depreciation deduction under Internal Revenue Code Section 280F?
- D. Is any property listed on line 1 an integral part of a building or structure?
- E. Does any of the property listed on line 1 have a useful life of less than 3 years?

If you answered "Yes" to any question above, please attach an explanation as to how the qualifying basis was determined and identify the property involved on line 1, Part I using the applicable letter(s) for the description above.

\*Automobile basis limitation under \$280F

**FORM N-312** 

**FORM** 

N-312 (REV. 1983) Hawaiian Electric Industries, Inc. and Subsidiaries

99-0208097

#### PART II — RECAPTURE OF CAPITAL GOODS EXCISE TAX CREDIT

Name(s) as shown o Hawa i ia	FE TO THE RESERVE TO	IN or SSN 99-0208097
Properties	G.E. Description of property. (Attach a separate sheet if more	0176418 space is needed.)
Α	Hawaiian Electric Company, Inc.	
В	Hawaii Electric Light Company, Inc.	
С	Maui Electric Company, Ltd.	
D		
Е		

				Properties		
RECAPTURE COMPUTATION:		Α	В	С	D	Ε
See Specific Instructions)						
1. Original rate of credit (4%)		4%	4%	4%	4%	4%
2. Date recapture period begins						
(see Instructions)	2	Various	Various	Various		
Date property ceased to be eligible						
capital goods excise tax credit						
property. (see Instructions)	3	11	11	t1		
Number of full years between the date		[				
on line 2 and the date on line 3	4	11	11	11	1	
Original or previously recomputed						
credit claimed. (see Instructions)	5	11	11	11	İ	
Recomputed credit. (see Instructions)	6	11	† E	11		
Decrease in credit due to disposition.	1 1					
(Line 5 minus line 6.)	7	11	11	11		
Recapture percentage. (from						
Instructions)	8	11	11	. 11		
. Recapture tax. (Line 7 multiplied						
by line 8.)		2,691	29,526	221		
Total increase in tax. (Add line 9			11111			
columns A through E.) Report this amount	on the a	ppropriate form a	s noted below	******	10	32,43

Enter or include the amount on line 10 above on the appropriate form as indicated below:

Form F-1, line 40;

Form N-12, line 38;

Form N-15, line 38;

Form N-20, Schedule K, line 19;

Form N-30, Schedule J, line 18;

Form N-35, Schedule K, line 17;

Form N-40, line 23; or

Form N-70NP, line 11.

-		CAPITAL GOODS			
}		EXCISE TAX CREDIT			A41-A41-A41-A41-A41-A41-A41-A41-A41-A41-
FORM N-312 (REV. 1994)	SEE SEPARATE IN	NSTRUCTIONS BEFORE COMPL	ETING THIS	FORM.	1994
	Or fiscal year beginning	, 19, and ending		, 19	_
ATTACH THIS SCHEDI	JLE TO FORM F-1, N-12, N-15,	, N-30, N-40, OR N-70NP	1	6N OR FEIN 9-0208097	
lame			<del></del>	waii G.E./Use Ide	ent. Number
	DUSTRIES, INC. AND SUBSIDIA	ARIES I claim, must be filed on or before the end		0176418	
PART I COMPUT	(a) Description of Proper separate sheet if more sp	•	purchase	tte property d or placed in whichever is	(c) Cost of qualifying
	(a) Description of Proper separate sheet if more sp	•	purchase service,		(c) Cost of qualifying property
HAWAIIAN ELECTRIC	(a) Description of Proper separate sheet if more st	•	purchase service, 6 1994	d or placed in whichever is	property 179,728
HAWAIIAN ELECTRIC	(a) Description of Proper separate sheet if more spindustries, Inc.	•	purchase service, € 1994	d or placed in whichever is	property 179,728 64,738,526
HAWAIIAN ELECTRIC HAWAIIAN ELECTRIC HAWAIIAN ELECTRIC	(a) Description of Proper separate sheet if more spansive industries, Inc. COMPANY, INC. LIGHT COMPANY, INC.	•	purchase service, 1994 1994	d or placed in whichever is	property 179,726 64,738,526 16,145,987
HAWAIIAN ELECTRIC	(a) Description of Proper separate sheet if more spansate sheet	•	purchase service, € 1994	d or placed in whichever is	property 179,726 64,738,526 16,145,987 12,519,135
HAWAIIAN ELECTRIC HAWAIIAN ELECTRIC HAWAIIAN ELECTRIC MAUI ELECTRIC COMP	(a) Description of Proper separate sheet if more spansate sheet s	•	purchase service, € 1994 1994 1994	d or placed in whichever is	property 179,726 64,738,526 16,145,987
1.  HAWAIIAN ELECTRIC HAWAIIAN ELECTRIC HAWAIIAN ELECTRIC MAUI ELECTRIC COMP. YOUNG BROTHERS, LT	(a) Description of Proper separate sheet if more spansate sheet s	•	purchase service, £ 1994 1994 1994 1994	d or placed in whichever is	property 179,726 64,738,526 16,145,987 12,519,139 2,494,984
HAWAIIAN ELECTRIC HAWAIIAN ELECTRIC HAWAIIAN ELECTRIC MAUI ELECTRIC COMP. YOUNG BROTHERS, LT WAIIAN TUG & BAR	(a) Description of Proper separate sheet if more spansate sheet s	•	purchase service, £ 1994 1994 1994 1994 1994	d or placed in whichever is	property  179,726 64,738,526 16,145,987 12,519,138 2,494,984 50,745
HAWAIIAN ELECTRIC HAWAIIAN ELECTRIC HAWAIIAN ELECTRIC MAUI ELECTRIC COMP. YOUNG BROTHERS, LT WAIIAN TUG & BAR	(a) Description of Proper separate sheet if more spansate sheet s	pace is needed	purchase service, £ 1994 1994 1994 1994 1994	d or placed in whichever is	property  179,726 64,738,526 16,145,987 12,519,138 2,494,984 50,745
HAWAIIAN ELECTRIC HAWAIIAN ELECTRIC HAWAIIAN ELECTRIC MAUI ELECTRIC COMP. YOUNG BROTHERS, LT WAIIAN TUG & BAR	(a) Description of Proper separate sheet if more spansate sheet s	pace is needed  C	purchase service, £ 1994 1994 1994 1994 1994	d or placed in whichever is	property  179,726 64,738,526 16,145,987 12,519,138 2,494,984 50,745
HAWAIIAN ELECTRIC HAWAIIAN ELECTRIC HAWAIIAN ELECTRIC MAUI ELECTRIC COMP. YOUNG BROTHERS, LT WAIIAN TUG & BAR	(a) Description of Proper separate sheet if more spansate sheet s	c64,738,526.00 x	purchase service, £ 1994 1994 1994 1994 1994	d or placed in whichever is	property  179,726 64,738,526 16,145,987 12,519,138 2,494,984 50,745
HAWAIIAN ELECTRIC HAWAIIAN ELECTRIC HAWAIIAN ELECTRIC MAUI ELECTRIC COMP. YOUNG BROTHERS, LT WAIIAN TUG & BAR	(a) Description of Proper separate sheet if more spansate sheet s	C	purchase service, £ 1994 1994 1994 1994 1994	d or placed in whichever is	property  179,726 64,738,526 16,145,987 12,519,138 2,494,984 50,745
HAMAIIAN ELECTRIC HAMAIIAN ELECTRIC HAMAIIAN ELECTRIC MAUI ELECTRIC COMP YOUNG BROTHERS, LT WAIIAN TUG & BARK LAMA PACIFIC COR	(a) Description of Proper separate sheet if more spansate sheet s	C	purchase service, £ 1994 1994 1994 1994 1994	d or placed in whichever is	property  179,726 64,738,526 16,145,987 12,519,138 2,494,984 50,745

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HI FORM N-312 (R	EV. 1994)	99-0208097	
PART II F	RECAPTURE OF CAPITAL GOODS EXCISE TAX CREDIT		
HAWAIIAN E	on return. CLECTRIC INDUSTRIES, INC. AND SUBSIDIARIES	FEIN or SSN 99-0208097	
Properties	Description of property. (Attach a separate sheet if more s	pace is needed.)	
A	HAWAIIAN ELECTRIC COMPANY, INC.		
В	HAWAIIAN ELECTRIC LIGHT COMPANY, INC.		
С	MAUI ELECTRIC COMPANY, LTD.		
D			

	Properties					
RECAPTURE COMPUTATION: (See Specific Instructions)		Α	8	С	D	Е
Original rate of credit (4%)	1	4%	4%	4%	4%	4%
Date recapture period begins -(see Instructions)	2	VARIOUS	VARIOUS	VARIOUS		
Date property ceased to be eligible capital goods excise tax credit		WAD TOTIC	TIAD TOUG			
property. (see Instructions)	3	VARIOUS	VARIOUS	VARIOUS		
on line 2 and the date on line 3	4					
Original or previously recomputed credit claimed. (see instructions)	5					
Recomputed credit. (see Instructions)	6					
Decrease in credit due to disposition. (Line 5 minus line 6.)	7					
Recapture percentage. (from Instructions)	8					
Recapture tax. (Line 7 multiplied by line 8.)	9	2,171.	26,799.	1,725.		

Enter or include the amount on line 10 above on the appropriate form as indicated below: (Form N-20 and N-35 filers, use Form N-312A)

Form F-1, line 40;

Form N-12, line 38;

Form N-15, line 38;

Form N-30, Schedule J, line 18;

Form N-40, line 23; or

Form N-70NP, line 11.

12/18/95

TTL END ACCT

TTL END ACCT

TTL END ACCT

35400

35500

35510

HECO OUTSIDE SVC AND PURCHASES FOR STATE ITC CALCULATION

REPORT ACG220

16,866,534.12

2,968,616.16

308,730.73

EFFECTIVE DATE 8801 TO 9512 CLOSE DATE OF 9501 TO 9512 ACCT 10700/1, 18611-18614 CST TYP 2XX,5XX

PAGE

CA-IR-88 <sup>1</sup> DOCKET NO. 04-0113 PAGE 24 OF 45

	END ACCT	AMT			
TTL DID ACCT	19791	194,798.15	<u>3)</u> RP: √ 5,235,21€		
TTL END ACCT	12102	10,337.25	Jep 5102.040		
TTL DND ACCT	12105	30,68	<b>-</b> ®		
THE END ACCT	31110	1,879,323.28	<del>-</del> •		
TIL END ACCT	31120	31,533.00			
TTL END ACCT	31130	433,133,12			
-TTL END ACCT	31149	33,303.00		t. 0 770 m	
TTL END ACCT	31210	639,611.67		TIE-OUT OF STATE ITC 182 2016,956,074.20	1 <u>E:</u>
TTL END ACCT	31220	88,886.83	<u>-</u>	×.04	-
TTL END ACCT	31400	1,063,108.82		2,618,214.97	_ 1995 STATE ITC
		:		• •	
_TL END ACCT	31500	522,977.19	les receptue	1.569	
TTL END ACCT	31500	522,977.19 876,998.34	les surptue	1,569	
		·	Ilas vien pitus	1,569 2,676,706	;
TTL END ACCT	31600	876,998.34	Ilas vien petus	1,569 2,676,706	<i>i</i>
TTL END ACCI	31600 34300	876,998.34 327,936.21		1,569 2,676,706	
TTL END ACCT	31600 34300 34400	876,998.34 327,936.21 3,266.58			;
TTL END ACCT TTL END ACCT TTL END ACCT	31600 34300 34400 34600.	876,998.34 327,936.21 3,266.58 41,232.09		1,569	į
TTL END ACCT  TTL END ACCT  TTL END ACCT  TTL END ACCT	31600 34300 34400 34600•/	876,998.34 327,936.21 3,266.58 41,232.09			
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EFFECTIVE DATE 8801 TO 9512 CLOSE DATE OF 9501 TO 9512 ACCT 10700/1, 18611-18614 CST TYP 2XX,5XX

88,929.51

	1	END ACCT	AMT
TTL END	ACCT	35600	2,872,128.85
TTL END	ACCT	35700	121,954.94
TTL END	ACCT	35800	247,208.86
THE END	ACCT	35900	279,774.60 🛞
TITL END	<del>NCT</del>	36110	<del>51,565.03</del>
TIL END	ACCT	36120	28,569.58
TTL END	ACCT	36200	503,290.30
TTL END	ACCT	36400	2,833,826.66
TTL END	ACCT	36410	467,303.22
TTL END	ACCT	36500	950,686.85
.TL END	ACCT	36600	6,817,613.71
TTL END	ACCT	36700	5,667,351.93
TTL END	ACCT	36800	5,028,059.72
TTL END	ACCT	36910	207,053.67
TTL END	ACCT	3692Q <sub>*/</sub>	1,789,265.22
TTL END	ACCT	37000	1,163,041.51
- TTL-END	ACCT	39000	771, 794, 75
TTL END	ACCT	39110	2,081,713.95
TTL END	ACCT	39120	272,410.50
TTL END	ACCT	39130	532,140.73
TTL END	ACCT	39200	1,500,587.83
TTL END	ACCT	39300	6,813.52

TTL END ACCT

39410

12/18/95

HECO OUTSIDE FOR STATE IT REPORT A

EFFECTIVE DATE 8801 TO 9512 CLOSE DATE OF 9501 TO 9512 ACCT 10700/1, 18611-18614 CST TYP 2XX,5XX

SVC AND PURCHASES	PAGE	CA-IR-88 DOCKET NO. 04-0113
TC CALCULATION		PAGE 26 OF 45
ACG220		
TE 8801 TO 9512		

	END ACCT	AMT
TTL END ACCT	39420	187,507.99
TTL END ACCT	39430	17,415.68
TTL END ACCT	39510	13,985.69
TTL END ACCT	39540	119,588.80
TTL END ACCT	39700	1,680,472.78
TIL END ACCT	39800	234,438.87

72,839,494.13 £ (5,882,619.85) \*\*\* GRAND TOTAL \*\*\*

CA-IR-88 DOCKET NO. 04-0113

12/20/96

HECO OUTSIDE SVC AND PURCHASES FOR STATE ITC CALCULATION

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REPORT ACG220 7 EFFECTIVE DATE 8801 TO 9612

ACCT 10700/1, 18611-18614

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END ACCT	AMT			
10701	10,959.86.	<b>(</b> E)		
31118	509,301.79			
31120	982.74			
31130	54,577.98	- Y		
31210	1,298,218.68	0	<b>40</b>	63,061,258.11 x.04
31220	273,587.10			
31400	137,032.36		1996 State	2,122,450,32 A
31500	1,332,364.77		710 =	^
31600	1,121,888.89		RECAPTURE	(3,079)
34300	118,764.96			
34400	735.03	<b>/</b>	NET STATE I	TC 2,119,371
35010	8,019,056.71	$(\mathcal{A})$		
35020	1,000.00			· ·

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HECO OUTSIDE SVC AND PURCHASES
FOR STATE ITC CALCULATION
REPORT ACG220
EFFECTIVE DATE 8801 TO 9612
CLOSE DATE OF 9601 TO 9612
ACCT 10700/1, 18611-18614
CST TYP 2XX,5XX

PAGE

END ACCT	AMT	_
35900	350,537.06	<b>(k</b> )
36020	3,249.06	
36110	346,609.57	
-36120	135,687.64	y
36200	3,840,786.61	0
36400	2,150,890.22	
36410	456,488.23	
36500	947,500.44	
36600	10,847,424.53	
36700	4,967,627.83	
36800	4,801,367.29	
36910	314,057.55	
36920	1,075,243.90	
37000	611,249.16	Y
39000	<del></del>	$\Theta$
39110	1,149,267.14	(1)
39120	97,442.24	
39130	550,648.59	
39200	3,667,115.56	
39300	4,807.31	
39410	3,673.97	
39420	162,190.56	
39430	374,610.35	<i>y</i>

\_2/20/96

HECO OUTSIDE SVC AND PURCHASES

PAGE

FOR STATE ITC CALCULATION

REPORT ACG220

EFFECTIVE DATE 8801 TO 9612

CST TYP 2XX,5XX

END ACCT 11,431.40 39510 39540 61,446.94 1,854,925.28 39700 202,178.96 39800

64,004,185.17

\*\*\* GRAND TOTAL \*\*\*

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HECO OUTSIDE SVC AND PURLASES FOR STATE ITC CALCULATION REPORT ACG220SU EFFECTIVE DATE 8801 TO 9712

CLOSE DATE OF 9701 TO 9712 ACCT 10700/1, 18611-18614

CST TYP 2XX,5XX

		/	1
	END ACCT	AMT	List of Outside Material
TTL END ACCT	10701	7.92- 🛞	List of Outside Materials  + Services fix computing  State I10.
TTL END ACCT	12102	2,137.50	State I10.
TTL END ACCT	31110	460,475.19	
TTL END ACCT	31130	94,388.50	
TTL END ACCT	31210	394,493.92	
TTL END ACCT	31220	329,708.44	
TTL END ACCT	31400	692,259.55	
TTL END ACCT	31500	97,284.45	
TTL END ACCT	31600	401,378.29	
TTL END ACCT	34200	104,544.50	
ITL END ACCT	34300	691.15	
TTL END ACCT	34500	5,352.60	
TTL END ACCT	34600	982,134.57	
TIL END ACCT	35010	<del>47,048.3</del> 5 ⊗	
TTL END ACCT	35020	746,294.79	
TTL END ACCT	35210	423,596.50	
TTL END ACCT	35230	1,635,268.64	
TTL END ACCT	35300	6,784,068.68	
TTL END ACCT	35400	658,652.60	
TTL END ACCT	35500	2,841,650.70	
TTL END ACCT	35510	388,288.88	
TTL END ACCT	35600	887,528.55	he say 3 So cale of
TTL END ACCT	35700	509,354.84	bee pay 3 for calc. %
			State ITU

TTL END ACCT

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39300

39410

39420

HECO OUTSIDE SVC AND PITE, AGEG

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FOR STATE ITC CALCULATION REPORT ACG220SU EFFECTIVE DATE 8801 TO 9712 CLOSE DATE OF 9701 TO 9712 ACCT 10700/1, 18611-18614 CST TYP 2XX,5XX

		END ACCT	TMA	
	TTL END ACCT	35800	652,075.17	
	TIL END ACCI	35900	99,424.02 🛞	
	TIL END ACCI	36020	18,373.39	
	TTL END ACCT	36110	70.37	
	TTL END ACCT	36120	219,022.12	
	TTL END ACCT	36200	1,502,352.17	
	TTL END ACCT	36400	2,392,810.64	
	TTL END ACCT	36410	501,944.31	
	TTL END ACCT	36500	612.286.65	
_				
	TTL END ACCT	36600	1,120,475.93	
	TTL END ACCT	36700	3,978,816.95	
	TTL END ACCT	36800	4,107,241.13	
	TTL END ACCT	36910	5,316.03-	
	TTL END ACCT	36920	1,278,866.67	
	TTL END ACCT	37000	519,614.20	
	TTL END ACCT	39000	611,728.18	
	TTL END ACCT	39110	963,928.65	
	TTL END ACCT	39120	369,265.77	
	TTL END ACCT	39130	260,657.52	
	TTL END ACCT	39200	2.230_908.47	
		2000		

8,518.92

36,115.83

150,661.12

PAGE

3

### PAGE 32 OF 45

2/15/97

• •

HECO OUTSIDE SVC AND PURCLASES
FOR STATE ITC CALCULATION
REPORT ACG220SU
EFFECTIVE DATE 8801 TO 9712
CLOSE DATE OF 9701 TO 9712
ACCT 10700/1, 18611-18614
CST TYP 2XX,5XX

			END ACCT	TMA		
TTL	END	ACCT	39430	223,194.46		
TTL	END	ACCT	39540	107,317.78		
TTL	END	ACCT	39700	2,421,314.18		
TTL	END	ACCT	39800	139,366.32		
				43,007,628.16	*** GRAND	TOTAL ***
			heal Property	<4,361,819.63>		
			40	38,649,808.53		
			÷	x . 04		
			1991 State	1,545,992.34		

1991 State =	1,545,992.34
RECAPTURE	7,114.00
NET STATE ITC	1,538,848
PER TAX ACURUM	1,578,604

-2/15/98

TTL END ACCT

35700

1998

HECO OUTSIDE SVC AND PURCHASES FOR STATE ITC CALCULATION REPORT ACG220SU EFFECTIVE DATE 8801 TO 9812 CLOSE DATE OF 9801 TO 9812

ACCT 10700/1, 18611-18614 CST TYP 2XX,5XX

END ACCT AMT TIL END ACCI 1,553,350,75 TIL END RCC 2.750.28 TIL END ACC 1,945,917,30 TIL END ACCI 31210 TTL END ACCT 31220 738,176.20 TTL END ACCT 31400 468,482.82 TTL END ACCT 43,991.99 31500 TIL END ACCI 31600 357,903.72 TIL END ACCT 34200 4,028.12 TTL END ACCT 34400 152.61 TTL END ACCT 34500 5,455.37 TIL END ACCI 969,541.44-TTL END ACCT 35236 TIL END ACCE TIL END ACCI 35300 411,324.70 TTL END ACCT 35400 39,916.42 2.471,125.41 > 2,744 642.47 + 13,838.00 = 2,758,480.47 TIL END ACCI 35500 TIL END ACCI 35510 1.082,105.27 + 1,261.00 = 1,083,357.27 TTL END ACCT 35600

862.72

PAGE

List of Outside Material + Services Sur computing State ITC. Added amounts are for the Kam Hury Project which closed late.

Lee calculation on pa 3.

./15/98

HECO OUTSIDE SVC AND PURCHASES
FOR STATE ITC CALCULATION
REPORT ACG220SU
EFFECTIVE DATE 8801 TO 9812
CLOSE DATE 0F 9801 TO 9812
ACCT 10700/1, 18611-18614
CST TYP 2XX,5XX

PAGE 2

	END ACCT	AMT	
TTL END ACCT	35800	140,785.43	
TIL END ACCT	35900	<u> </u>	
TTL END ACCT	36110	27,847.59	
TTL END ACCT	36130	452,211,55	
TIL END ACCI	36200	2,415,686.50	
TTL END ACCT	36400	3,029,540.90	3,637,807.55+104.960.00= 3,742,767.55
TTL END ACCT	36410	608,266.65 /	
TTL END ACCT	36500	1,056,807.80 +	8,0635 1,074.860.80
TIL END ACCT	36600	4,020,392.61 +	294596.00 = 12,317,088.61
TTL END ACCT	36700	6,285,786.92 4	P94,422.00=7,380,208.92
TIL END ACCT	36800		35,167.00 = 4,013,719.07
TIL END ACCI	36910	167,933.00 -	022.00 = 168,265.00
TIL END ACCT	36920	1,799,876.40+ 3	7,491.00= 1,832,367,40
TTL END ACCT	37000	846,082.05	1002/2011
'- END ACCT	<del>39000</del>	1,185,728.60 (	$\mathfrak{D}$
TTL END ACCT	39110	1,694,608.19	
TIL END ACCT	39120	66,136.37	
TTL END ACCT	39130	111,009.39	
TIL END ACCT	39200	2,807,501.64	
TIL END ACCT	39300	46,633.04	•
TTL END ACCT	39410	13,874.16	
TTL END ACCT	39420	79,243.12	
TTL END ACCT	39430	309,762.74	

CA-IR-88 DOCKET NO. 04-0113 PAGE 35 OF 45

ky 9/11/99

(3) Last page of report HECO OUTSIDE SVC AND PURCHASES 15/98 FOR STATE ITC CALCULATION REPORT ACG220SU EFFECTIVE DATE 8801 TO 9812 Adjusted for Kam Hury projects not energy zed as of 12/31/98. CLOSE DATE OF 9801 TO 9812 ACCT 10700/1, 18611-18614 CST TYP 2XX,5XX END ACCT AMT TTL END ACCT 39510 171,497.44 TIL END ACCT 39540 1,777.55 TTL END ACCT 39700 962,092.08 TIL END ACCT 39800 45,944.64 41,926,074.96 \*\*\* GRAND TOTAL \*\*\* Less: Real Add: Kam Huy 9,547,790.00 41,130,409.96 47,130,409.96 Stall I/C 1,885,216,40
As Pyroper of Energized < 1,639,445,007 45,590,964.96 .04 As My. 1,823,638.60 RECORT WRE NOT STATE ITC 1,821, 699.60 BER ACCHUAL (4,518) Difference-RE

-, <u>-</u>

HAWAIIAN ELECTRIC COMPANY, INC. EXCLUDED ITEMS (REAL PROPERTY RELATED) FROM ITC CALCULATION

FYE: 12/31/99

work order	acct	exp el	amount	
		201 Total	264,844.02	7
		205 Total	1,557.81	
		221 Total	2.00	
		501 Total	1,106,108.48	$\searrow (\Delta)$
		502 Total	25,505.72	14
		505 Total	583,749.23	
		506 Total	336,517.24	
		508 Total	25,778.98	
		520 Total	289.48	
		521 Total	16.04	. /
		201 Total	15,954,938.93	15,954,938.93
		205 Total	91,599.39	91,599.39
		222 Total	10.85	10.85
		223 Total	15,157.31	15,157.31
		501 Total	3,588,270.28	3,588,270.28
		502 Total	81,493.57	81,493.57
		503 Total	32,181.57	32,181.57
		505 Total	6,466,714.71	6,466,714.71
		506 Total	4,195,938.99	4,195,938.99
		508 Total	1,559.89	1,559.89
		520 Total	13,074.01	13,074.01
		521 Total	1,766.78	1,766.78
		570 Total	169,099.80	169,099.80
		Grand Tot	32,956,175.08	30,442,706.28
			1704	•
			•	0.04
				1,217,708.25

A) THESE TIEMS WERE EXCUMPED DUE TO BEILD PART OF REAL PROPERTY RELATED WORK ORDERS. SEE



HAWAIIAN ELECTRIC COMPANY, INC. STATE ITC COMPUTATION

FYE: 12/31/99

work order number	utility account id	cost elem	compute 0004	cost types 2xx & 5xx
		9 Total	4,220,904.61	
		10 Total	921,765.13	
		107 Total	0.15	
		150 Total	10,358,889.68	
		155 Total	97.60	
		201 Total	16,219,782.95	16,219,782.95
		205 Total	93,157.20	93,157.20
		221 Total	2.00	2.00
		222 Total	10.85	10.85
•		223 Total	15,157.31	15,157.31
		301 Total	20,459.42	
		404 Total	(103,778.85)	
		405 Total	(34,072.45)	
		406 Total	1,667.81	
		407 Total	7.20	
		421 Total	(6,598.79)	
		422 Total	(14,041.81)	
		423 Total	(5,488.61)	
		451 Total	525.00	
		452 Total	6,237.00	
		462 Total	2,194.57	
		501 Total	4,694,378.76	4,694,378.76
		502 Total	106,999.29	106,999.29
		503 Total	32,181.57	32,181.57
		505 Total	7,050,463.94	7,050,463.94
		506 Total	4,532,456.23	4,532,456.23
		508 Total	27,338.87	27,338.87
		520 Total	13,363.49	13,363.49
		521 Total	1,782.82	1,782.82
		570 Total	169,099.80	169,099.80
		640 Total	20,485.71	
		900 Total	(568,283.62)	
		910 Total	2,577,986.67	
		999 Total	8,476,675.17	
		Grand Tot	58,831,806.67	32,956,175.08
		,		ŕ
	Added Asset Repo	nt (Total Alds)	73,527,773.21	
	Kam Highway Subt		(14,684,576.37)	
	Sub-total		58,843,196.84	_
	Reconciling differer	nce - pass	(11,390.17)	:

Note: > This schedules recorded from part agos extracted from participants by COST-TYPE TO ENGINE ALL ADOTROLS

ARE PROPERLY ACCOUNTED FOR AN THE ABOVE ITC SCHOOLE.

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#### 9/4/2001

Hawaiian Electric Company, Inc. State ITC - Summary . 2000

Total Unadjusted	48,822,392.66
Deduct Record Type M - 201 and 223 Expense Elements	(2,013,488.69)
Deduct Stores On-Cost on Record Type S - 201 and 505, and Record Type W - 201	(1,316,696.45)
Deduct Real Property Items	(3,588,899.99)
Adjusted Base for ITC Calculation	41,903,307.53
% Credit Applied	4.0%
Total State ITC	1,676,132.30
Recapture	(264.00)
Net State ITC	1,675,868.30
Per tax accrual	1,809,351.00
Difference - post year end adjustment	(133,482.70)

# 1000

I Total

M Total P Total

Q Total

S Total

W Total

! Total

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P Total

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P Total

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M Total P Total

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**Total Unadjusted** 

pre-mims Total

#### 9/4/2001

Hawaiian Electric Company, Inc.

State ITC - Summary by Record Type and Expense Element

EXPENSE ELEMENT

201

201

201

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48,822,392.66

Expele 2xx - Haterials

Exp. Eie 5xx : Outside Sives

(See distingt on

Record Types found with the SumOfAMOUNT 3,144,074.21 above exp. elements (Sec 2,010,763.39 7,425,563.10 1,443,366.75 (10,417.14)4,360,852.61 4,245,937.77 22,620,140.69 174,807.29 4,913.80 201,778.02 22,056.93 52.07 2,725.30 12,447.07 15,224.44 3,681,521.63 (306,579.05)114,199.19 218,995.07 78.40 3,708,215.24 8,509.48 5,961.91 14,471.39 277.62 220.32 497.94 16,521,354.52 190,954.45 1,293.99 3,138,865.09 584.08 19,853,052.13 588,370.29 (66,650.47)1,803,165.98 2,324,885.80 9,018.70 (12,000.00)12,000.00 9,018.70 19,769.31 19,586.74 (182.57)1,625.51 188.00 1,813.51 12,152.79 12,152.79 41,555.27 201- 22 - 20,140.69 41,555.27

48,822,392.66

### 12/31/2001

Hawaiian Electric Company, Inc. State ITC - Summary - 2001

Total Unadjusted	63,668,209.15
Deduct Record Type M - 201 and 223 Expense Elements	(2,128,418.40)
Deduct Stores On-Cost on Record Type S - 201 and 505, and Record Type W - 201	(895,514.39)
Deduct Exp Elements 5XX - Others	(9,083.21)
Deduct Real Property Items	(1,322,966.10)
Adjusted Base for ITC Calculation	59,312,227.05
% Credit Applied	4.0%
Total State ITC	2,372,489.08
Recapture	(100.00)
Net State ITC	2,372,389.08
Per tax accrual	2,328,892.00
Difference - post year end adjustment	43,497.08

2001

ILITY ACCOUNT	Utility Account Lookup	SumOfAMOUNT
	3110 Total	614,732.69 (1)
	3112 Total	2,040.00 \
	3120 Total	
	3140 Total	464,739.94
	3150 Total	148,384.85
	3160 Total	484,347.59
	3501 Total	306,804.48
\$	3503 Total	1,086.00
\$1,000°, 1.1000.000.000.000.000.000.000.000.000.	3523 Total	3,123.79
	3530 Total	1,838,422.49
	3540 Total	320,066.08
	3550 Total	2,046,137.09
	3560 Total	
	3580 Total	1,125,360.25
	3601 Total	430.95 🔱
	3602 Total	10,414.00
on the same demonstrate to the test of a second	3620 Total	1,932,714.05
	3640 Total	4,681,422.12
	3650 Total	1,453,365.98
	3660 Total	315,673.43
	3670 Total	2,878,895.85
	3680 Total	1,330,319.46
	3691 Total	731,559.03
	3692 Total	29,214,957.58
	3700 Total	673,856.46
pagagagang nama namanan cita ta na naman na naman namahababab	3730 Total	15,234.85
	3900 Total	248,588.42 (1)
·	3902 Total	135,745.77
	3911 Total	1,101,768.34
	3912 Total	3,967.49
	3913 Total	***************************************
	3920 Total	Acceptace and the second and the second acceptace acceptace and the second acceptace acceptace and the second acceptace acceptace acceptace and the second acceptace acceptace acceptace acceptace acceptace acceptace and the second acceptace accept
and the second s	3941 Total	
	3943 Total	\$440,000,000,000,000,000,000,000,000,000
i : :	3970 Total	Accessors and a second accessors and a second
	3980 Total	1,130,588.94

Shortington of Real Frequery
Charages ~

For 2xx + 5xx

Expense Elements Only

READ PROPERTY -20 1,322,966.10 00010

**Grand Total** 

63,668,209.15 からしり

Hawaiian Electric Company, Inc. State ITC - Summary 2002 - FINAL

Total Unadjusted 56,091,582.79

Deduct Record Type M - 201 and 223 (2,256,613.59)

**Expense Elements** 

Deduct Stores On-Cost on Record Type S - 201 (1,474,533.53)

and 505, and Record Type W - 201

Deduct Exp Elements 5XX - Others (21,426.30)

Deduct Real Property Items (2,907,008.82)

Administration of the ITO October 1981

τ....

2002

# To exclude Real Property Acids from SITC Basis -

MPANY	TransType	<b>DST</b>	ELEMENT	K_ORDER_NU	INFUTILITY_ACCOU	SumOfSumOfAMOUNT
		T			3110 Total	1,733,217.88
					3120 Total	5,297,530.38
					3121 Total	53,140.46
					3140 Total	1,639,264.93
					3150 Total	191,026.63
					3160 Total	2,899,739.26
					3410 Total	313,228.90
					3502 Total	(10,296.00)
		1			3503 Total	11,455.00
		1			3523 Total	12,748.48
					3530 Total	
					3550 Total	£
					3560 Total	
					3570 Total	1
					3580 Total	<u> </u>
					3601 Total	·
				<u> </u>	3602 Total	
					3610 Total	<u> </u>
				]	3620 Total	L 4_237_066.96

<u> </u>	
<u> </u>	
E .	
-	

	3650 Total	1,063,212.47	
	3660 Total	153,945.02 3,443,072.91	
	3670 Total		
·			·
. (-			
<u>}</u>			

### HAWAIIAN ELECTRIC CO., INC. State ITC - Summary 2003 - FINAL

	reference	
Total Unadjusted	BE 2	44,809,721.06
Deduct: Record Type M - 201 and 223 Expense Elements	BE 4	(2,627,296.98)
Deduct: Stores On-Cost on Record Type S - 201 and 505, and Record Type W - 201	BE 5	(1,316,603.65)
Deduct: Exp Elements 5XX - Others	BE 7	(79.70)
Deduct: Real Property Items	BE 2	(4,789,279.84)
Add: Software Purchases	BB 2	485,273.90
Add: Ellipse cost	BD 2	145,832.50
Add: nonutility assets	FO 6	63,997.44
Add: DSM assets	FL	2,384.72
Adjusted Base for ITC Calculation		36,773,949.45
% Credit Applied		4.0%
Total State ITC		1,470,957.98
Recapture		(471.00)
Net State ITC		1,470,486.98
Per tax accrual		1,354,300.00
Difference - post year end adjustment		116,186.98

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HAWAIIAN ELECTRIC CO., INC. STATE ITC 2003



#### CA-IR-89

# Ref: HECO-1703 Development of Federal Investment Tax Credit amortization.

Please provide a table or schedule showing the following for each vintage of Federal Investment Tax Credits:

- a. Initial ITC generated;
- b. Amortization period (number of years); and
- c. Ending unamortized balance as of December 31, 2003.

### **HECO** Response:

- a. The requested information is attached.
- b. The amortization period is 30 years.
- c. The ending unamortized balance as of December 31, 2003 is \$6,601,736.55.

RRED ITC						·	
	<u> </u>					····	<del></del>
	1972	1973	1974	1975	1976	1977	1978
		<del></del>			1,975,596.83	1,130,268.62	1,964,183.
(8,557.26)	(41,528.34)	(43,218.94)	(63,318.69)	(58,892.41)	(82,316.53)	(45,210.75)	(75,545.
15/ 020 71	790 020 46	064 270 97	1 200 600 51	1 005 000 00	1 000 000 00		(6,560.
(8 557 26)		<del></del>					1,882,077.
(0,007.20)	(41,020.04)	(43,216.34)	(63,316,69)	(30,092.41)	(62,316.53)	(45,152.43)	(75,283.
145,473.45	747,510.12	821,159,93	1,266,373,82	1,236,740,67	1 810 963 77	1 038 505 81	(1,498. 1,805,295.
(8,557.26)			(63,318.69)	***************************************			(75,220.
136,916.19	705,981.78	777,940.99	1,203,055.13	1,177,848.26	1,728,647.24	993,353.38	1,730,074.
(8,557.26)	(41,528.34)	(43,218.94)	(63,318.69)	(58,892.41)	(82,316.53)	(45,152.43)	(75,220.
	~~~~~~					948,200.95	1,654,853.
(8,557.26)	(41,528.34)	(43,218.94)	(63,318.69)	(58,892.41)	(82,316.53)	(45,152.43)	(75,220.
110 801 67	622 025 10	601 502 11	1 076 417 75	1.000.000.44	1.504.044.40	000 040 70	1 575 555
							1,579,633.
(0,0020)	17.,020.04)	(+0,210.94)	(60.03 (0.03)	(30,032.41)	(0∠,310.53)	(40, 102.43)	(75,220.
111,244.41	581,396.76	648,284.17	1,013,099.06	1,001,171.03	1.481.697.65	857.896.09	1,504,412.
(8,557.26)			(63,318.69)	(58,892.41)	(82,316.53)		(75,220.
							7,
102,687.15			949,780.37	942,278.62	1,399,381.12	812,743.66	1,429,191.
(8,557.26)	(41,528.34)	(43,218.94)	(63,318.69)	(58,892.41)	(82,316.53)	(45,152.43)	(75,220.
04 120 90	400 240 00	EC1 040 00	000 404 60	000 000 01			
			·····			~~~~	1,353,971.
(0,007.20)	(41,020.04)	(43,210.54)	(63,316.69)	(36,692.41)	(82,316.53)	(45,152.43)	(75,220.
85.572.63	456.811.74	518,627,35	823,142,99	824 493 80	1 234 748 06	722 438 80	1,278,750.
(8,557.26)	(41,528.34)						(75,220.
			1		<u> </u>	(10,110=110)	1,0,000
77,015.37	415,283.40	475,408.41	759,824.30	765,601.39	1,152,431.53	677,286.37	1,203,530.
(8,557.26)	(41,528.34)	(43,218.94)	(63,318.69)	(58,892.41)	(82,316.53)	(45,152.43)	(75,220.
							1,128,309.
							(75,220.
							1,053,088.
				······			(75,220.
			*********				977,868. (75,220.
	,	(19,=10.57)	(00)0.000/	(00,002.71)	(02,010.00)	(+5,102.40)	110,220.
42,786.33	249,170.04	302,532.65	506,549.54	530,031.75	823,165,41	496,676,65	902,647.
			ĺ				
(8 557 26)	(41 528 34)	(43 218 04)	(63 319 60)	(58 900 41)	(PO 216 E2)	/AE 150 AD	/7E 000
34,229.07		·······					(75,220.6 827,426.6
	,0 . , , , , ,			7. 1, 103.04	7-10,040.00	701,324.22	UZ1,420.i
				-			
(8,557.26)	(41,528.34)	(43,218.94)	(63,318.69)	(58,892.41)	(82,316.53)	(45,152.43)	(75,220.
25,671.81		216,094.77	379,912.16	412,246.93	658,532.35	406,371.79	752,206.
(8,557.26)			(63,318.69)	(58,892.41)	(82,316.53)	(45,152.43)	(75,220.
17,114.55	124,585.02	172,875.83	316,593.47	353,354.52	576,215.82		676,985.
						(45,152.43)	(75,220.0
						*********	601,764.
(0,557.29)							(75,220.
							526,544.
							(75,220.) 451,222
	J.00						451,323.1 (75,220.6
							(75,220.6
-	1,11111	13381					
	0.00	0.00	63,318.71 (63,318.71)	117,784.88 (58,892.41)	246,949.70 (82,316.53)	180,609.64 (45,152.43)	376,103.1 (75,220.6
	(8,557.26) 136,916.19 (8,557.26) 128,358.93 (8,557.26) 119,801.67 (8,557.26) 111,244.41 (8,557.26) 102,687.15 (8,557.26) 85,572.63 (8,557.26) 77,015.37 (8,557.26) 68,458.11 (8,557.26) 59,900.85 (8,557.26) 42,786.33 (8,557.26) 42,786.33 (8,557.26) 42,786.33	162,587.97 830,566.80 (8,557.26) (41,528.34) 154,030.71 789,038.46 (8,557.26) (41,528.34) 145,473.45 747,510.12 (8,557.26) (41,528.34) 136,916.19 705,981.78 (8,557.26) (41,528.34) 128,358.93 664,453.44 (8,557.26) (41,528.34) 119,801.67 622,925.10 (8,557.26) (41,528.34) 111,244.41 581,396.76 (8,557.26) (41,528.34) 102,687.15 539,868.42 (8,557.26) (41,528.34) 102,687.15 639,868.42 (8,557.26) (41,528.34) 102,687.15 (41,528.34) 102,687.15 (41,528.34) 102,687.15 (41,528.34) 102,687.15 (41,528.34) 102,687.15 (41,528.34) 102,687.15 (41,528.34) 102,687.26) (41,528.34) 102,687.26) (41,528.34) 102,687.26) (41,528.34) 102,687.26) (41,528.34) 102,687.26) (41,528.34) 102,687.26) (41,528.34) 102,687.26) (41,528.34) 102,687.26) (41,528.34) 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(43,218.94)  136,916.19 705,981.78 777,940.99 (8,557.26) (41,528.34) (43,218.94)  128,358.93 664,453.44 734,722.05 (8,557.26) (41,528.34) (43,218.94)  119,801.67 622,925.10 691,503.11 (8,557.26) (41,528.34) (43,218.94)  111,244.41 581,396.76 648,284.17 (8,557.26) (41,528.34) (43,218.94)  102,687.15 539,868.42 605,065.23 (8,557.26) (41,528.34) (43,218.94)  94,129.89 498,340.08 561,846.29 (8,557.26) (41,528.34) (43,218.94)  94,129.89 498,340.08 561,846.29 (8,557.26) (41,528.34) (43,218.94)  77,015.37 415,283.40 475,408.41 (8,557.26) (41,528.34) (43,218.94)  68,458.11 373,755.06 432,189.47 (8,557.26) (41,528.34) (43,218.94)  59,900.85 332,226.72 388,970.53 (8,557.26) (41,528.34) (43,218.94)  59,900.85 332,226.72 388,970.53 (8,557.26) (41,528.34) (43,218.94)  59,900.85 332,226.72 388,970.53 (8,557.26) (41,528.34) (43,218.94)  59,900.85 332,226.72 388,970.53 (8,557.26) (41,528.34) (43,218.94)  42,786.33 249,170.04 302,532.65  (8,557.26) (41,528.34) (43,218.94)  42,786.33 249,170.04 302,532.65  (8,557.26) (41,528.34) (43,218.94)  42,786.33 249,170.04 302,532.65  (8,557.26) (41,528.34) (43,218.94)  42,786.33 249,170.04 302,532.65  (8,557.29) (41,528.34) (43,218.94)  42,786.33 249,170.04 302,532.65  (8,557.29) (41,528.34) (43,218.94)  42,786.33 249,170.04 302,532.65	162,587.97   830,566.80   907,597.81   1,393,011.20     (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)     154,030.71   789,038.46   864,378.87   1,329,692.51     (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)     145,473.45   747,510.12   821,159.93   1,266,373.82     (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)     136,916.19   705,981.78   777,940.99   1,203,055.13     (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)     128,358.93   664,453.44   734,722.05   1,139,736.44     (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)     119,801.67   622,925.10   691,503.11   1,076,417.75     (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)     111,244.41   581,396.76   648,284.17   1,013,099.06     (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)     102,687.15   539,868.42   605,065.23   949,780.37     (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)     102,687.15   539,868.42   605,065.23   949,780.37     (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)     94,129.89   498,340.08   561,846.29   886,461.68     (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)     85,572.63   456,811.74   518,627.35   823,142.99     (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)     77,015.37   415,283.40   475,408.41   759,824.30     (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)     59,900.85   33,226.72   389,970.53   633,186.92     59,500.85   332,226.72   389,970.53   633,186.92     59,572.60   (41,528.34)   (43,218.94)   (63,318.69)     51,343.59   290,698.38   345,751.59   569,868.23     (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)     51,343.59   290,698.38   345,751.59   569,868.23     (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)     51,343.59   290,698.38   345,751.59   569,868.23     (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)     51,343.59   290,698.38   345,751.59   569,868.23     (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)     68,557.26)   (41,528.34)   (43,218.94)   (63,318.69)     68,557.26)   (41,528.34)   (43,218.94)   (6	162,587.97   830,566.80   907,597.81   1,393,011.20   1,354,525.49   (6.557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (53,030.71   789,038.46   864,378.87   1,329,692.51   1,295,633.08   (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (44,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (44,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (63,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (63,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (63,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (63,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (63,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (63,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (63,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (63,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (63,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (63,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,892.41)   (8,557.26)   (41,528.34)   (43,218.94)   (63,318.69)   (58,	62.567.97   830.566.80   907.597.81   1,393.011.20   1,354.525.49   1,975.586.83   (9.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (56.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (56.892.41)   (62.316.53)   (8.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (68.557.26)   (41.528.34)   (43	62.587.97   830.566.80   807.597.81   393.011.20   3,384.525.49   1,975.596.83   1,130,268.82   (8.557.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.121.75)   (1,596.82)   (1,596.82)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.152.43)   (45.57.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.152.43)   (45.57.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.152.43)   (45.57.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.152.43)   (45.57.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.152.43)   (45.57.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.152.43)   (45.57.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.152.43)   (45.152.43)   (45.57.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.152.43)   (45.57.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.152.43)   (45.57.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.152.43)   (45.57.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.152.43)   (45.57.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.152.43)   (45.57.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.152.43)   (45.57.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.152.43)   (45.57.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.152.43)   (45.57.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.152.43)   (45.57.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.152.43)   (45.57.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.53)   (45.152.43)   (45.57.26)   (41.528.34)   (43.218.94)   (63.318.69)   (58.892.41)   (62.316.5

HAWAJIAN ELECTRIC CO				1			· · · · · · · · · · · · · · · · · · ·	PAGE 3 OF
<b>AMORTIZATION OF DEFE</b>		*			1			<u> </u>
1971 REV ACT								
ACCOUNT #255020							<u> </u>	<del>                                     </del>
Dalan do Ind	1979	1980	1981	1982	1983	1984	1985	1986
Balance 12/31/82 Amortization	3,103,365.04	4,050,332.30	2,856,907.95	2,024,611.78				**Anne
Additions	(114,939.45)	(144,654.73)	<u> </u>					
Balance 12/31/83	2,985,651.12	(6,201.77) 3,899,475.80				<u> </u>		ļ
Amortization	(114,832,74)	(144,425.03)		1,953,719.95 (67,369.65)	1,833,433.22 (61,114,44)	-	-	-
Additions	(4,718.39)	(2,781.58)				1		
Balance 12/31/84	2,866,099.99	3,752,269.19	2,634,043.78	1,882,291.57	1,771,491.24	1,395,519,18	_	_
Amortization	(114,644.00)	(144,318.05)	(97,557.18)	(67,224.70)		<del></del>		
Additions	(1,308.89)	(1,064.12)	(909.61)	(2,692.31)		1 1	<del></del>	
Balance 12/31/85	2,750,147.10	3,606,887.02	2,535,576.99	1,812,374.56	1,708,755.39	1,346,436.74	2,245,086.56	<del>-</del>
Amortization Additions	(114,644.00)	(144,318.05)	(97,557.18)	(67,224.70)	(61,085.90)	(46,517.31)	(74,836.22)	
Balance 12/31/86	0.005.500.10	0.400.500.03	0.400.040.04					913,156.0
Amortization	2,635,503.10 (114,644.00)	3,462,568.97	2,438,019.81	1,745,149.86	1,647,669.49	1,299,919.43		913,156.0
Additions	(114,044.00)	(144,318.05)	(97,557.18)	(67,224.70)	(61,085.90)	(46,517.31)	(74,836.22)	(30,438.5
Balance 12/31/87	2,520,859.10	3,318,250.92	2,340,462.63	1,677,925.16	1,586,583.59	1,253,402.12	0.005.444.40	000 747 4
Amortization	(114,644.00)	(144,318.05)	(97,557.18)	(67,224.70)		(46,517,31)	(74,836,22)	882,717.4
Additions	, ,- , ,	(1.1.50.000)	(07,007.10)	(01,224.10)	(01,000,80)	(40,017.01)	(74,030.22)	(30,438.50
Balance 12/31/88	2,406,215.10	3,173,932.87	2,242,905.45	1,610,700.46	1,525,497.69	1,206,884.81	2,020,577.90	852,278.94
Amortization	(114,644.00)	(144,318.05)	(97,557.18)	(67,224.70)		**************************************	(74,836.22)	
Additions							, , , , , , , , , , , , , , , , , , , ,	1,
Balance 12/31/89	2,291,571.10	3,029,614.82	2,145,348.27	1,543,475.76	1,464,411.79	1,160,367.50	1,945,741.68	821,840.41
Amortization	(114,644.00)	(144,318.05)	(97,557.18)	(67,224.70)	(61,085.90)	(46,517.31)	(74,836.22)	(30,438.53
Additions Adjustment 81-84 RAR								
Balance 12/31/90	2,176,927.10	2 895 006 77	0.047.704.00	4 470 054 00				
Amortization	(114,644.00)	2,885,296.77 (144,318.05)	2,047,791.09	1,476,251.06	1,403,325.89	1,113,850.19		791,401.88
Additions	(114,044.00)	(144,316.05)	(97,557.18)	(67,224.70)	(61,085.90)	(46,517.31)	(74,836.22)	(30,438.53
Balance 12/31/91	2,062,283.10	2,740,978.72	1,950,233.91	1,409,026.36	1,342,239.99	1,067,332.88	1 700 000 04	700 000 00
Amortization	(114,644.00)	(144,318.05)	(97,557.18)	(67,224.70)	(61,085.90)	(46,517.31)	1,796,069.24 (74,836.22)	760,963.35
Additions		(,)	(01,007.10)	(07,EE-170)	(01,000.30)	(40,517.51)	(74,030.22)	(30,438.53
Balance 12/31/92	1,947,639.10	2,596,660.67	1,852,676.73	1,341,801.66	1,281,154.09	1,020,815,57	1,721,233.02	730,524.82
Amortization	(114,644.00)	(144,318.05)	(97,557.18)	(67,224.70)	(61,085.90)	(46,517.31)	(74,836.22)	(30,438.53
Additions								
Balance 12/31/93	1,832,995.10	2,452,342.62	1,755,119.55	1,274,576.96	1,220,068.19	974,298.26	1,646,396.80	700,086.29
Amortization Balance 12/31/94	(114,644.00)	(144,318.05)	(97,557.18)	(67,224.70)	(61,085.90)	(46,517.31)	(74,836.22)	(30,438.53
Amortization	1,718,351.10	2,308,024.57	1,657,562.37	1,207,352.26	1,158,982.29	927,780.95	1,571,560.58	669,647.76
Balance 12/31/95	1,603,707.10	(144,318.05) 2,163,706.52	(97,557.18) 1,560,005.19	(67,224.70)	(61,085.90)	(46,517.31)	(74,836.22)	(30,438.53
Amortization	(114,644.00)	(144,318.05)	(97,557.18)	1,140,127.56 (67,224.70)	1,097,896.39 (61,085.90)	881,263.64	1,496,724.36	639,209.23
1985-87 RAR adjt	(111,017,00)	\144,010.05)	(37,007.10)	(07,224.70)	(61,065.90)	(46,517.31)	(74,836.22)	(30,438.53 (38,298.00
Balance 12/31/96	1,489,063.10	2,019,388.47	1,462,448.01	1.072.902.86	1,036,810.49	834,746.33	(15,252.00) 1,406,636.14	570,472,70
Reclass 81-84 RAR			(48,290.00)	22,704.00	8,258.00	504,145.00	1,700,000.14	370,472.70
Adj amort 81-84 RAR to 96			15,365.00	(10,595.20)	(3,578.51)			
Adj 97 amort 81-84 RAR			2,195.00	(757.00)	(275.00)			
Adj 97 amort 85-87 RAR							802.73	1,914.87
Adj recapture amort to 96	599.94	468.16	384.89	1,096.92	648.23	972.95		
Adj 97 recapture amort	54.54	42.56	34.99	99.72	58.93	88.45		
Amortization Balance 12/31/97	(114,644.00) 1,375,073.58	(144,318.05)	(97,557.18)	(67,224.70)	(61,085.90)	(46,517.31)	(74,836.22)	(30,438.53)
Reclass 90-91 RAR	1,373,073.36	1,875,581.14	1,334,580.71	1,018,226.60	980,836.24	789,290.42	1,332,602.65	541,949.04
Adj amort 90-91 RAR to 98								
Amortization	(114,589.46)	(144,275.49)	(95,327.19)	(67,881.98)	(61,301.97)	(46,428.86)	(74,033.49)	(00 E00 CC)
Balance 12/31/98	1,260,484.12	1,731,305.65	1,239,253.52	950,344.62	919,534.27	742,861.56	1,258,569.16	(28,523.66) 513,425.38
Amortization	(114,589.46)	(144,275.49)	(95,327.19)	(67,881.98)	(61,301.97)	(46,428.86)	(74,033.49)	(28,523.66)
Balance 12/31/99	1,145,894.66	1,587,030.16	1,143,926.33	882,462.64	858,232.30	696,432.70	1,184,535.67	484,901.72
Amortization	(114,589.46)	(144,275.49)	(95,327.19)	(67,881.98)	(61,301.97)	(46,428.86)	(74,033.49)	(28,523.66)
Balance 12/31/00	1,031,305.20	1,442,754.67	1,048,599.14	814,580.66	796,930.33	650,003.84	1,110,502.18	456,378.06
Amortization	(114,589.46)	(144,275.49)	(95,327.19)	(67,881.98)	(61,301.97)	(46,428.86)	(74,033.49)	(28,523.66)
Balance 12/31/01	916,715.74	1,298,479.18	953,271.95	746,698.68	735,628.36	603,574.98	1,036,468.69	427,854.40
Amortization Balance 12/31/02	(114,589.46)	(144,275.49)	(95,327.19)	(67,881.98)	(61,301.97)	(46,428.86)	(74,033.49)	(28,523.66)
Amortization	802,126.28	1,154,203.69	857,944.76	678,816.70	674,326.39	557,146.12	962,435.20	399,330.74
THE PROPERTY OF THE PROPERTY O	(114,589.46)	(144,275.49)	(95,327.19)	(67,881.98)	(61,301.97)	(46,428.86)	(74,033.49)	(28,523.66)
Jalance 12/31/03	687 536 92	1 000 000 00	760 617 67 1					270 207 00
lalance 12/31/03	687,536.82 (114,589,46)	(144 275 49)	762,617.57	610,934.72	613,024.42	510,717.26	888,401.71	370,807.08
Amortization	(114,589.46)	(144,275.49)	(95,327.19)	(67,881.98)	(61,301.97)	(46,428.86)	(74,033.49)	(28,523.66)
			<del></del>					(28,523.66) 342,283.42 (28,523.66)

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HAWAIIAN ELECTRIC CO	w	i		·····		T****		· · · · · · · · · · · · · · · · · · ·			PAGE 4 OF 4
"IORTIZATION OF DEFE	<u>*</u>	<u> </u>					<del> </del>		ļ		
71 REV ACT				<u> </u>			+		<del> </del>		
COUNT #255020			-						<u> </u>		
			<u> </u>			<del> </del>	<del> </del>		1		
	1987	1988	1989	1990	81-84 RAR	1991	1992	1993	1994	90-91 RAR	Total
Balance 12/31/82		1500	.303	1330	UI-OF HAT	1991	1992	1333	1994	90-91 NAR	Total 21,753,555.04
Amortization						ļ	<del> </del>		<del> </del>		(844,183.74
Additions						<del>                                     </del>					1,805,811.84
Balance 12/31/83		-	_		<u>-</u>	<u> </u>	-		-	-	22,715,183.14
Amortization		5							<del>  -</del>	-	(904,263.6
Additions					<u> </u>		+		<del> </del>		1,362,818.06
Balance 12/31/84	-					<del>-</del>	+	1 -	_	_	23,173,737.59
Amortization						<del></del>	<del>-</del>	-		-	·
Additions			)		i			ļ	<del> </del>		(949,552.37
Balance 12/31/85	-	-	_		_	-	<del>  -</del>	_	-		2,234,896.55
Amortization						1	<del>  -</del> -	-	-		24,459,081.77
Additions							<del> </del>	<del> </del>			(1,024,388.59
Balance 12/31/86	-	-	_	-	-	_	-	<u> </u>	<del> </del>		913,156.00
Amortization					-		+		<u> -                                     </u>	-	24,347,849.18
Additions							<del> </del>	1			(1,054,827.12
Balance 12/31/87		-					+		ļ		-
Amortization	(10,199.40)		•	•	•	-	-	-	•	-	23,293,022.06
Additions	305,982.00	44,950.00				ļ	<del> </del>		<del> </del>		(1,065,026.52
Balance 12/31/88	295,782.60				<u> </u>	<del>                                     </del>	-				350,932.00
Amortization		44,950.00	-	-	-	-	1 -	-	-	-	22,578,927.54
Additions	(10,199.40)	(1,498.33)	0.007.00				<u> </u>		<u> </u>		(1,066,524.85
Balance 12/31/89	005 500 00	10 151 00	3,997.39				<u> </u>				3,997.39
Amortization	285,583.20		3,997.39		*		-	-	-	-	21,516,400.08
Additions	(10,199.40)	(1,498.33)	(133.14)			<u> </u>					(1,066,657.99
				11,021.00			<u> </u>				11,021.00
Adjustment 81-84 RAR					(17,328.00)						(17,328.00
Baiance 12/31/90	275,383.80			11,021.00	(17,328.00)	-	-	-	-	-	20,443,435.09
Amortization	(10,199.40)	(1,498.33)	(133.14)	(367.37)			<u> </u>			]_	(1,067,025.36
Additions						668.00	4				668.00
Palance 12/31/91	265,184.40	40,455.01	3,731.11	10,653.63	(17,328.00)	668.00	-	-	-	- [	19,377,077.73
ortization	(10,199.40)	(1,498.33)	(133.14)	(367.37)		(22.27)	-				(1,067,047.63)
litions							(3.00)				(3.00
Balance 12/31/92	254,985.00	38,956.68	3,597.97	10,286.26	(17,328.00)	645.73	(3.00)	-	-	-	18,310,027.10
Amortization	(10,199.40)	(1,498.33)	(133.14)	(367.37)		(22.27)	(0.10)				(1,067,047.73
Additions								1,778.00			1,778.00
Balance 12/31/93	244,785.60	37,458.35	3,464.83	9,918.89	(17,328.00)	623.46	(3.10)	1,778.00	-	-	17,244,757.37
Amortization	(10,199.40)		(133.14)	(367.37)		(22.27)		(59.27)			(1,067,106.60
Balance 12/31/94	234,586.20	35,960.02	3,331.69	9,551.52	(17,328.00)	601.19	(2.80)	1,718.73	-	•	16,177,650.77
Amortization	(10,199.40)		(133.14)	(367.37)	•	(22.27)	0.30	(59.27)			(1,067,106.60)
Balance 12/31/95	224,386.80	34,461.69	3,198.55	9,184.15	(17,328.00)	578.92	(2.50)		-	-	15,110,544.17
Amortization	(10,199.40)	(1,498.33)	(133.14)	(367.37)		(22.27)	0.30	(59.27)			(1,067,106.60)
1985-87 RAR adjt	(8,755.00)							i			(62,305.00
Balance 12/31/96	205,432.40	32,963.36	3,065.41	8,816,78	(17,328.00)	556.65	(2.20)	1,600.19	-	-	13.981,132.57
Reclass 81-84 RAR					17,328.00		,,	.,			
Adj amort 81-84 RAR to 96											1,191.29
Adj 97 amort 81-84 RAR											1,163.00
Adj 97 amort 85-87 RAR	416.93							<del> </del>			3,134.53
Adj recapture amort to 96							<del>                                     </del>			<del></del>	4,171.09
Adj 97 recapture amort											379.19
Amortization	(10,199.40)	(1,498.33)	(133.14)	(367.37)		(22.27)	0.30	(59.27)			(1,067,106.60
Balance 12/31/97	195,649.93	31,465.03	2,932.27	8,449.41		534.38	(1.90)		_		12,924,065.07
Reclass 90-91 RAR	,	2.1,700.00		-, TIV.TI	-	237.00	(1.30)	1,0-0.3£	-	(11,280.00)	(11,280.00
Adj amort 90-91 RAR to 98							,		<del>-</del>	3,008.00	3,008.00
Amortization	(9,782.47)	(1,498.33)	(133.14)	(367.37)		(22.27)	0.30	(59.27)		3,000.00	(1,062,429.88)
Balance 12/31/98	185,867.46	29,966.70	2,799.13	8,082.04					-	(0.070.00)	
Amortization	(9,782.47)		(133.14)		<u> </u>	512.11	(1.60)			(8,272.00)	11,853,363.19
Balance 12/31/99				(367.37)		(22.27)		(59.27)		376.00	(1,062,053.88)
Amortization	176,084.99 (9,782.47)	28,468.37	2,665.99	7,714.67	-	489.84	(1.30)		-	(7,896.00)	10,791,309.31
Amonization Balance 12/31/00			(133.14)	(367.37)		(22.27)		(59.27)	ļ	376.00	(1,062,053.88)
	166,302.52	26,970.04	2,532.85	7,347.30	-	467.57	(1.00)		-	(7,520.00)	9,729,255.43
Amortization	(9,782.47)	(1,498.33)		(367.37)		(22.27)	0.30	(59.27)		376.00	(1,062,053.91)
Balance 12/31/01	156,520.05	25,471.71	2,399.71	6,979.93	-	445.30	(0.70)		-	(7,144.00)	8,667,201.52
Amortization	(9,782.47)	(1,498.33)	···	(367.37)		(22.27)	0.30	(59.27)		376.00	(1,053,496.62
Balance 12/31/02	146,737.58		2,266.57	6,612.56		423.03	(0.40)		-	(6,768.00)	7,613,704.90
***************************************	(O 700 47)	(1,498.33)	(133.14)	(367.37)		(22.27)	0.30	(59.27)		376.00	(1,011,968.35)
ortization	(9,782.47)										
ortization ince 12/31/03	136,955.11	22,475.05	2,133.43	6,245.19	-	400.76	(0.10)	1,185.30	-	(6,392.00)	6,601,736.55
ortization Ince 12/31/03 Incrization	136,955.11 (9,782.47)	22,475.05 (1,498.33)	2,133.43 (133.14)	(367.37)	-	400.76 (22.27)	(0.10) 0.10	1,185.30 (59.27)	-	376.00	
ortization ince 12/31/03 ortization Balance 12/31/04	136,955.11 (9,782.47) 127,172.64	22,475.05 (1,498.33) 20,976.72	2,133.43 (133.14) 2,000.29	(367.37) 5,877.82	- 11	(22.27) 378.49		(59.27)	-		
ortization Ince 12/31/03 Incrization	136,955.11 (9,782.47)	22,475.05 (1,498.33)	2,133.43 (133.14) 2,000.29 (133.14)	(367.37)		(22.27)	0.10	(59.27)		376.00	(968,749.56)

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CA-IR-90

# Ref: HECO-WP-1705a and 1705b.

To the extent any have been prepared, please provide all budget variance reports for year-end 2004 accumulated deferred income reserve balances.

# **HECO Response:**

There are no budget variance reports for the accumulated deferred income reserve balances.

CA-IR-91

### Ref: Prior Federal and state income tax returns.

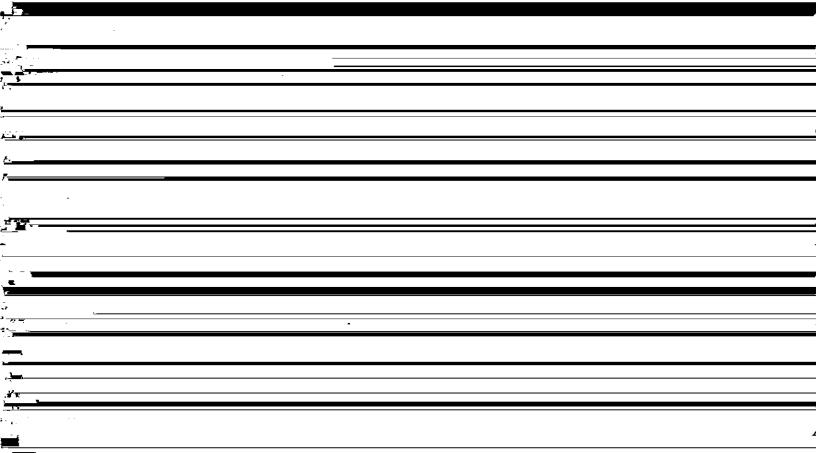
Please provide a listing of all book/tax differences and related Schedule M amounts for stand alone HECO, HELCO and MECO and consolidated HEI for the tax years 2002 and 2003, as well as preliminarily calculated for calendar year 2004. Additionally, for each book/tax difference designate which differences are "temporary" differences and which differences are "permanent" differences.

### **HECO** Response:

Book/tax differences for HECO, HELCO, MECO, and HEI Consolidated for 2002, 2003 and 2004 are attached.

Perm (P) or Temp (T) Difference	Line	Schedule M-1	HEI Consolidated Schedule M-1	Combined Utilities and Renewable Hawaii, Inc.	HEI and Combined Non- Utility Companies
	,	<b>X</b> Y-4 (	2/0.0/1.//0		
P	1	Net income per books	368,814,410	122,743,577	246,070,833
P	2	Federal income tax	50,537,723	37,446,896	13,090,827
	3	Excess cap losses over gains	0	0	0
	4	Income subject to tax not recorded on books			
T		DIVIDEND INCOME - TAX	86,418,495	0	86,418,495
T		CAPITAL GOODS EXCISE TAX CREDIT - TAX	2,872,923	2,855,408	17,515
T		PROPERTY DISPOSALS - TAX	(21,377)	0	(21,377)
T		CIAC RECEIVED	2,924,086	2,924,086	0
T		CUSTOMER ADVANCES RECEIVED	61,154	46,657	14,497
T		HAWAII TAX CREDITS - OTHER TAX	29,707	29,707	0
T		JV & PARTNERSHIP INCOME OR LOSS - TAX	(4,855,836)	(108,051)	(4,747,785)
Ť		FEE INCOME - BOOK	(748,694)	0	(748,694)
T		IRC §593 RECAPTURE LOSS RESERVES	2,466,466	0	2,466,466
T		LOAN FEES AND COSTS	2,700,993	0	2,700,993
T		RECIP LOAN SALE - LOSS RECAP	22,577	0	22,577
T		LEVERAGED LEASE INCOME OR LOSS - TAX	8.741,024	0	8,741,024
T		INTEREST INCOME - TAX	2,420	0	2,420
		Total Other	100,613,938	5,747,807	94,866,131
	5	Expenses recorded on books	,		
T	50	not deducted on return	116 000 700	105 710 600	10 100 000
Ť		Depreciation	115,909,789	105,710,699	10,199,090
P	50 50	Contributions carryover	0	0	0
r	30	Travel and Entertainment	346,751	85,223	261,528
P		CLUB DUES	26,714	13,581	13,133
P		CURRENT STATE INCOME TAXES	2,155,078	5,362,824	(3,207,746)
P		DEFERRED FEDERAL TAX EXPENSE	8,310,067	11,754,848	(3,444,781)
P		DEFERRED STATE TAX EXPENSE	2,672,304	2,076,970	595,334
P		EXCESS COMPENSATION EXPENSE	1,815,283	651,382	1,163,901
P		LOBBYING	158,924	148,794	10,130
T		DEFERRED COMP EMPLOYEES - BOOK	2,347,560	320,929	2,026,631
T		DIRECTORS' COMPENSATION - BOOK	64,098	11,055	53,043
T		STOCK OPTION INCENTIVE PLAN - BOOK	1,456,672	0	1,456,672
T		VACATION - BOOK	58,765	50,226	8,539
P		PENALTIES AND FINES	14	14	0
P		PREFERRED STOCK ISSUE COSTS	80,215	80,215	0
T		APPRISE COSTS	2,061,578	2,061,578	0
T T		BAD DEBTS - BOOK	11,100,368	1,763,931	9,336,437
T		BOND ISSUE EXP - BOOK AMORT	717,433	717,433	0
T		CAPITALIZED INTEREST	5,753,836	5,753,836	0
Ť		PENSION - EXCESS PLAN BOOK	71,462	71,462	0
T		PENSION - OPEB BOOK	7,416,069	7,415,069	1,000
T		PENSION - SERP BOOK	148,036	142,532	5,504
T		PENSION EXPENSE - BOOK	(19,692,515)	(19,707,986)	15,471
T		PROFESSIONAL FEES - TAX	55,769	55,643	126
T		RESERVES - BOOK	1,509,427	1,483,081	26,346
T		SOFTWARE - BOOK	545,097	544,649	448
T		OTHER PERMANENT DIFFERENCES	7	7	0
		BOND REDEMPTION COSTS	100,227	100,227	0
T T		ENERGY SERVICES - BOOK	8,307,679	8,307,679	0
		PROFESSIONAL FEES - BOOK	241,981	241,981	0
T		RATE HEARINGS COSTS - BOOK	69,744	69,744	0
P Tr		PLANT ACQ ADJ - BOOK	52,141	52,141	0
T		AMORT EXPENSE BOOK	291,556	168	291,388
T T		WORKERS COMPENSATION - BOOK	687,117	431,763	255,354
1		CORE DEPOSITS - BOOK	1,730,400	0	1,730,400

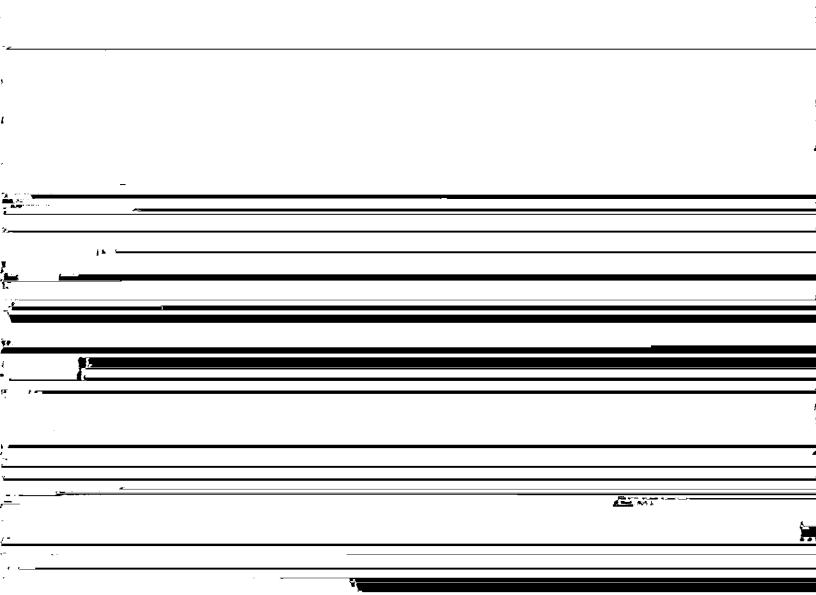
T FRANCHISE TAXES - TAX 77.716 0 77.716 T IRC \$481A ADJUSTMENT 25.922.514 0 25.922.514 T PMSR - BOOK 2.568.854 0 2.568.854 T STATE INCOME TAXES - OTHER 109.753 0 109.753 T CAPITALIZED STARTUP COSTS 1.678 0 1.678 T CAPITALIZED EXPENSES 672.747 0 672.747 P OTHER PERMANENT DIFFERENCES 1 0 1 T COST OF SALES - BOOK 1.148.239 0 1.148.239 T DISCOUNTS & PREMIUMS - BOOK (17.339) 0 (17.339) 5d Total Other 70.797.269 29.975.776 40.821.493  6 Total lines 1 - 5 707.019.880 301.709.978 405.309.902  7 Income recorded on books not included on return P 7 Tax-exempt interest 0 0 0 0  P BOOK EQUITY INCOME 327.744.673 30.544.707 297.199.966 T PROPERTY DISPOSALS - BOOK (5.225.996) 0 (5.225.996) T DEFERRED GAIN - BOOK AMORT 195.956 195.956 0 T HONOLULU HARBOR RESERVE 35.302 35.302 0 T LEASE RENT PREMIUM - BOOK AMORT 22.800 6.805 15.995 T WAIAU WATER WELL - BOOK AMORT 64.578 64.578 0 P TAX EXEMPT INTEREST (660) (60) 0	Perm (P) or Temp (T) Difference	Line	Schedule M-1	HEI Consolidated Schedule M-1	Combined Utilities and Renewable Hawaii, Inc.	HEI and Combined Non- Utility Companies
T IRC \$481A ADJUSTMENT 25,922,514 0 25,922,514 T PMSR - BOOK 2,568,854 0 2,568,854 T STATE INCOME TAXES - OTHER 109,753 0 109,753 T CAPITALIZED STARTUP COSTS 1,678 0 1,678 0 1,678 T CAPITALIZED EXPENSES 672,747 0 672,747 D 672,747 D 1 COST OF SALES - BOOK 1,148,239 0 1,148,239 DISCOUNTS & PREMIUMS - BOOK (17,339) 0 (17,339) 5d Total Other 70,797,269 29,975,776 40,821,493	T		FRANCHISE TAXES - TAX			
T PMSR - BOOK T STATE INCOME TAXES - OTHER T CAPITALIZED STARTUP COSTS T CAPITALIZED STARTUP COSTS T CAPITALIZED EXPENSES T CAPITALIZE T CAPITA	T			,	=	
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T CAPITALIZED EXPENSES 672,747 0 672,747 P OTHER PERMANENT DIFFERENCES 1 0 1 T COST OF SALES - BOOK 1,148,239 0 1,148,239 DISCOUNTS & PREMIUMS - BOOK (17,339) 0 (17,339) 5d Total Other 70,797,269 29,975,776 40,821,493  6 Total lines 1 - 5 707,019,880 301,709,978 405,309,902  7 Income recorded on books not included on return P 7a Tax-exempt interest 0 0 0 0  P BOOK EQUITY INCOME 327,744,673 30,544,707 297,199,966 T PROPERTY DISPOSALS - BOOK (5,225,996) 0 (5,225,996) T DEFERRED GAIN - BOOK AMORT 195,956 195,956 0 T HONOLULU HARBOR RESERVE 35,302 35,302 0 T LEASE RENT PREMIUM - BOOK AMORT 22,800 6,805 15,995 T WAIAU WATER WELL - BOOK AMORT 64,578 64,578 0 P TAX EXEMPT INTEREST (60) (60) (60) 0	T			•	-	
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T DISCOUNTS & PREMIUMS - BOOK (17,339) 0 (17,339) 5d Total Other 70,797,269 29.975,776 40,821,493  6 Total lines 1 - 5 707,019,880 301,709,978 405,309,902  7 Income recorded on books not included on return  P 7a Tax-exempt interest 0 0 0 0  P BOOK EQUITY INCOME 327,744,673 30,544,707 297,199,966  T PROPERTY DISPOSALS - BOOK (5,225,996) 0 (5,225,996)  T DEFERRED GAIN - BOOK AMORT 195,956 195,956 0  T HONOLULU HARBOR RESERVE 35,302 35,302 0  T LEASE RENT PREMIUM - BOOK AMORT 22,800 6,805 15,995  T WAIAU WATER WELL - BOOK AMORT 64,578 64,578 0  T TAX EXEMPT INTEREST (60) (60) 0				1 140 000	•	I
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6 Total lines 1 - 5  707,019,880  301,709,978  40,821,493  707,019,880  301,709,978  405,309,902  7 Income recorded on books not included on return  P 7a Tax-exempt interest  0 0 0  P BOOK EQUITY INCOME T PROPERTY DISPOSALS - BOOK (5,225,996)  T DEFERRED GAIN - BOOK AMORT 195,956 195,956 195,956 195,956 0 106,000 107  LEASE RENT PREMIUM - BOOK AMORT 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,956 195,95	•	5.4				
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P   Tax-exempt interest   0   0   0   0   0   0   0   0   0		6	Total lines 1 - 5	707,019,880	301,709,978	405,309,902
P         7a         Tax-exempt interest         0         0         0           P         BOOK EQUITY INCOME         327.744,673         30,544,707         297,199,966           T         PROPERTY DISPOSALS - BOOK         (5,225,996)         0         (5,225,996)           T         DEFERRED GAIN - BOOK AMORT         195,956         195,956         0           T         HONOLULU HARBOR RESERVE         35,302         35,302         0           T         LEASE RENT PREMIUM - BOOK AMORT         22,800         6,805         15,995           T         WAIAU WATER WELL - BOOK AMORT         64,578         64,578         0           P         TAX EXEMPT INTEREST         (60)         (60)         (60)         0		7	Income recorded on books			
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T PROPERTY DISPOSALS - BOOK (5,225,996) 0 (5,225,996) T DEFERRED GAIN - BOOK AMORT 195,956 195,956 0 HONOLULU HARBOR RESERVE 35,302 35,302 0 LEASE RENT PREMIUM - BOOK AMORT 22,800 6,805 15,995 T WAIAU WATER WELL - BOOK AMORT 64,578 64,578 0 P TAX EXEMPT INTEREST (60) (60) 0	P		BOOK EOUITY INCOME	227 744 672	30 544 700	-0
T DEFERRED GAIN - BOOK AMORT 195,956 195,956 0 HONOLULU HARBOR RESERVE 35,302 35,302 0 LEASE RENT PREMIUM - BOOK AMORT 22,800 6,805 15,995 T WAIAU WATER WELL - BOOK AMORT 64,578 64,578 0 P TAX EXEMPT INTEREST (60) (60) 0	Т		•	/		
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T LEASE RENT PREMIUM - BOOK AMORT 22.800 6.805 15.995 T WAIAU WATER WELL - BOOK AMORT 64.578 64.578 0 TAX EXEMPT INTEREST (60) (60) 0	T			,	,	-
T WAIAU WATER WELL - BOOK AMORT 64,578 64,578 0  P TAX EXEMPT INTEREST (60) (60) 0				•		•
P TAX EXEMPT INTEREST (60) (60) 0						
(00) (60)				,		
				** /	,	0



Perm (P) or Temp (T) Difference	Lin	e Schedule M-1	HEI Consolidated Schedule M-1	Combined Utilities and Renewable Hawaii, Inc.	HEI and Combined Non- Utility
T		ELECTRIC DISCOUNT TRUST - TAX	5,291	5,291	Companies
T		ELECTRIC DISCOUNT TRUST - TAX	2.948	2.948	0
Ť		ELECTRIC DISCOUNT TRUST - TAX	379,143	379,143	0
T		ENERGY SERVICES - TAX	3,826,890	3.826.890	<del>-</del>
T		LOSS ON ABANDONED ASSETS	1,735,100	1,516,138	0
T		PENSION - EXCESS PLAN TAX	142,478	142,478	218,962
T		PENSION - OPEB TAX	6.264.421	6,264,421	0
T		PENSION - SERP TAX	72,086	67,590	0
T		VACATION - TAX	(56.668)	(34,682)	4,496
T		WORKERS COMPENSATION - TAX	566,990	496,989	(21,986)
Т		SOFTWARE - TAX	37,832	37.832	70,001
T		RESERVES - TAX	139,594	120,100	0
T		ACQ DISCOUNTS & PREMIUMS	131,789	120,100	19,494
T		CORE DEPOSITS - TAX	1,635,058	0	131,789
T		GOODWILL - TAX	4,771,174	0	1,635,058
T		PMSR - TAX	323,440	0	4.771,174
P		STATE INCOME TAXES - TAX	541,899	0	323,440
T		CAPITALIZED EXPENSES	112,429	•	541,899
T		PENSION EXPENSE - TAX	15.876	0	112,429
T		DISCONTINUED OPERATIONS - BOOK	3,481,751	•	15,876
T		AMORT EXPENSE TAX	548,275	0 0	3,481,751
T		COST OF SALES - TAX	1,179,541	0	548,275
		Total Other	75,359,306	40,666,356	1,179,541
			75,559,500	40,000.338	34,692,950
	9	Total lines 7 - 8	522,415.753	179.441.613	342,974,140
	10	Income (line 28 page 1)	184,604,127	122,268,365	62,335,762

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Perm (P) or Temp (T) Difference	Lin	ne Schedule M-1	Combined Utilities and Renewable Hawaii, Inc.	HAWAIIAN ELECTRIC COMPANY, INC.	HAWAII ELECTRIC LIGHT COMPANY, INC.	MAUI ELECTRIC COMPANY, LTD.	RENEWABLE HAWAII INC.
	1	Net income per books	122,743,577	91,283,875	12,977,325	18,482,377	n
P	2	Federal income tax	37,446,896	24,224,375	4,577,170	8,645,351	0
T	3	Excess cap losses over gains	0	0	0	0,045,551	0
	4	Income subject to tax not recorded on books					
T		DIVIDEND INCOME - TAX	0	0	n	0	0
T		CAPITAL GOODS EXCISE TAX CREDIT - TAX	2,855,408	1.976.642	391,487	487,279	0
T		PROPERTY DISPOSALS - TAX	0	1,5,0,0.0	0	407,279	0
T		CIAC RECEIVED	2,924,086	545,976	1,129,546	1.248.564	-
T		CUSTOMER ADVANCES RECEIVED	14 457	174.022	1,149,340	1,248,304	0



Perm (P) or Temp (T) Difference	Lin	ie Schedule M-1	Combined Utilities and Renewable Hawaii, Inc.	HAWAHAN ELECTRIC COMPANY, INC.	HAWAII ELECTRIC LIGHT COMPANY, INC.	MAUI ELECTRIC COMPANY, LTD.	RENEWABLE HAWAII INC.
т		WORKERS COMPENSATION - BOOK	431.763	•	_	_	
T		CORE DEPOSITS - BOOK	431,703 0	0	0	431,763	0
T		FRANCHISE TAXES - TAX	0	0	0	0	0
T		IRC §481A ADJUSTMENT	0	0	0	0	0
T		PMSR - BOOK	0	0	0	0	0
Т		STATE INCOME TAXES - OTHER	0	0	0	0	0
T		CAPITALIZED STARTUP COSTS	0	0	0	0	0
T		CAPITALIZED EXPENSES	0	0	0	0	0
P		OTHER PERMANENT DIFFERENCES	0	0 1	0	0	0
T		COST OF SALES - BOOK	0	0	0	0	0
T		DISCOUNTS & PREMIUMS - BOOK	0	0	0	0	0
	5d	Total	29,975,776	12.032.256	8.016,581	0 000 000	0
		•	22,775,170	12.032.236	8.010,381	9,926,939	0
	6	Total lines 1 - 5	301.709.978	193.936.910	47,224,857	60,548,211	0
	7	Income recorded on books					
	,	not included on return					
P	7a	Tax-exempt interest	^				
-		tax exempt merest	0	0	0	0	0
P		BOOK EQUITY INCOME	30,544,707	30,544,707	0	- 0	
T		PROPERTY DISPOSALS - BOOK	0	0	0	- 0	0
T		DEFERRED GAIN - BOOK AMORT	195,956	195,956	0	0	0
T		HONOLULU HARBOR RESERVE	35,302	35,302	Õ	0	0
T		LEASE RENT PREMIUM - BOOK AMORT	6,805	6,805	Ô	0	0
Т		WAIAU WATER WELL - BOOK AMORT	64,578	64,578	0	0	0
₽		TAX EXEMPT INTEREST	(60)	0	(60)	0	0
T		CAPITALIZED REPAIRS	(1,085,952)	0	(1,085,952)	0	0
T		DEFERRED INCOME & FEES	o o	0	0	0	0
Т		FEE INCOME - TAX	0	Õ	ő	0	0
Т		JV & PARTNERSHIP INCOME OR LOSS - BOOK	0	0	ŏ	0	0
T		RENT DEPOSIT	0	0	ő	0	0
T		RESERVE-UNCOLLECTED INTEREST	0	6	Ô	^	2

Perm (P) or Temp (T) Difference	Line Schedule M-1	Combined Utilities and Renewable Hawaii, Inc.	HAWAIIAN ELECTRIC COMPANY, INC.	HAWAII ELECTRIC LIGHT COMPANY, INC.	MAUI ELECTRIC COMPANY, LTD.	RENEWABLE HAWAII INC.
т	AFUDC - EQUITY GROSS UP	2,518,671	2 222 227	120.000	- 1 - 0	
Ť	BARBER'S PONT RESERVE	181.126	2,238,337	138,298	142,036	0
Ť	BOND INTEREST DIFFERENTIAL	449.160	181,126	0	0	0
Ť	COST OF REMOVAL	5,631,746	431,139	18,228	(207)	0
Ť	ELECTRIC DISCOUNT TRUST - TAX		3,579,190	1,334,554	718,002	0
Ť	ELECTRIC DISCOUNT TRUST - TAX	(1,405) 5,291	(892)	(354)	(159)	0
Ť	ELECTRIC DISCOUNT TRUST - TAX	2,948	3,348	1,211	732	0
Ť	ELECTRIC DISCOUNT TRUST - TAX	2,948 379,143	2.283	736	(71)	0
Ť	ENERGY SERVICES - TAX	3,826,890	264,230	68,053	46,860	0
Ť	LOSS ON ABANDONED ASSETS	1.516.138	1,129	1,142,981	2,682,780	0
Ť	PENSION - EXCESS PLAN TAX		1,125,076	401,724	(10,662)	0
Ť	PENSION - OPEB TAX	142,478	142.478	0	0	0
Ť	PENSION - SERP TAX	6,264,421	4,681.156	851,414	731,851	0
Ť	VACATION - TAX	67,590	67.590	0	0	0
Ť	WORKERS COMPENSATION - TAX	(34,682)	(7,104)	(27,578)	0	0
Ť	SOFTWARE - TAX	496,989	345,124	151,865	0	0
Ť	RESERVES - TAX	37,832	0	30,987	6,845	0
Ť	ACQ DISCOUNTS & PREMIUMS	120,100	0	0	120,100	0
Ť	CORE DEPOSITS - TAX	0 0	0	0	0	0
Ť	GOODWILL - TAX	0	0	0	0	0
Ť	PMSR - TAX	0	0	0	0	0
P	STATE INCOME TAXES - TAX	0	0	0	0	0
T	CAPITALIZED EXPENSES	0	0	0	0	0
Ť	PENSION EXPENSE - TAX	0	•	0	0	0
Ť	DISCONTINUED OPERATIONS - BOOK	0	0	0	0	0
Ť	AMORT EXPENSE TAX	0	0	0	0	0
Ť	COST OF SALES - TAX	0	0	0	0	0
•	Total Other	40.666.356	26,549,375	0	0	0
	Total Offici	40,000,330	20,349,375	6,831,962	7,285,019	0
	9 Total lines 7 - 8	179,441.613	117,629.433	28,561,674	33,250,506	0
	10 Income (line 28 page 1)	122,268.365	76.307.477	18,663,183	27,297,705	0

Permanent (P) or Temporary(T) Difference	Line	Schedule M-1	Consolidated Schedule M-1	Combined Utilities and Renewable Hawaii, Inc.	HEI and Combined Non- Utility Companies
	1	Net income per books	344,864,313	110,127,979	234,736,334
P	2	Federal income tax	53,222,230	31,935,323	21,286,907
T	3	Excess capital losses over gains	0 0	0 0	21,260,907
•		Execus capital losses over gams	U	V	U
	4	Income subject to tax not recorded on books			
T		DIVIDEND INCOME - TAX	64,586,075	0	64,586,075
Т		CAPITAL GOODS EXCISE TAX CREDIT - TAX	3,446,698	2,746,145	700,553
Т		PROPERTY DISPOSALS - TAX	(562,066)	0	(562,066)
Т		CAP GAINS(LOSSES) - TAX	182,895	0	182,895
T		CIAC RECEIVED	1,537,556	1,537,556	0
T		HAWAII TAX CREDITS - OTHER TAX	107,124	107,124	0
Ť		JV & PARTNERSHIP INCOME OR LOSS - TAX	(443,058)	(78,886)	(364,172)
Ť		DEFERRED INCOME & FEES	96,612	0	96,612
Ť		FEE INCOME - TAX	1,276,662	ő	1,276,662
Ť		STATE LOW INC HOUSING TAX CREDIT - TAX	115,525	ő	115,525
Ť		INTEREST INCOME - TAX	3,836	0	3.836
Ť		IRC §481A ADJUSTMENT	25,922,514	Ö	25,922,514
Ť		RENT DEPOSIT	28,512	0	28,512
Ť		RECIP LOAN SALE - LOSS RECAP	22,664	0	22,664
Ť		LEVERAGED LEASE INCOME OR LOSS - TAX	9,496,723	0	9,496,723
•		TE VERNOUS SERVICE IN CONTROL OF BODG - I'M	105,818,272	4,311,939	101,506,333
	5	Expenses recorded on books not deducted on return	100,016,272	7,211,727	101,500,555
T	5a	Depreciation	120,866,849	110,791,401	10,075,448
Ť	5b	Contributions carryover	0	0	0
P	5c	Travel and Entertainment	388,920	97,172	291,748 0
P		CLUB DUES	71,502	13,920	57,582
P		CURRENT STATE INCOME TAXES	2,890,814	4,785,372	(1,894,558)
P		DEFERRED FEDERAL TAX EXPENSE	4,960,339	11,603,330	(6,642,991)
P		DEFERRED STATE TAX EXPENSE	1,117,373	1,500,121	(382,748)
P		EXCESS COMPENSATION EXPENSE	1,086,055	0	1,086,055
P		LOBBYING	172,219	164,021	8,198
P		STOCK ISSUE COSTS	14,219	0	14,219
T		DEFERRED COMP EMPLOYEES - BOOK	3,568,388	580,079	2,988,309
T		DIRECTORS' COMPENSATION - BOOK	69,099	11,096	58,003
T		PENSION - OPEB BOOK	11,429,918	11,169,194	260,724
T		PENSION - SERP BOOK	1,215,129	226,398	988,731
T		PENSION EXPENSE - BOOK	13,999,164	9,494,479	4,504,685
T		STOCK OPTION INCENTIVE PLAN - BOOK	2,087,916	0	2,087,916
P		POLITICAL CONTRIBUTIONS	500	500	0
P		PREFERRED STOCK ISSUE COSTS	81,976	81,976	0
T		APPRISE COSTS	2,180,195	2.180.195	0
T		BAD DEBTS - BOOK	4,789.480	1,714,480	3,075,000
T		BOND ISSUE EXP - BOOK AMORT	393,775	393,775	0
T		CAPITALIZED INTEREST	5,219,019	5,219,019	0
T		INTEREST EXPENSE - BOOK	455,506	455,506	0
T		PENSION - EXCESS PLAN BOOK	201.479	116,788	84,691
T		RESERVES - BOOK	(472,074)	(472,074)	0
Ť		SOFTWARE - BOOK	184,160	183,917	243
Ť		EMISSIONS FEE	1,511,394	1,511,394	0
T		AES HI PPA AMENDMENT	163,388	163,388	0
Ť		CIS PROJECT	408,877	408,877	ő
P		OTHER PERMANENT DIFFERENCES	3,207	(2)	3,209
P		PENALTIES AND FINES	763,060	763,060	0
T		ENERGY SERVICES - BOOK	4.042,912	4.042.912	0
Ť		PROFESSIONAL FEES - BOOK	196.726	196.726	0
Ť		RATE HEARINGS COSTS - BOOK	69.744	69.744	0

## HAWAIIAN ELECTRIC INDUSTRIES, INC. AND SUBSIDIARIES Consolidating Schedule M-1 $12/31/2003\,$

Permanent (P)				Combined Utilities and	HEI and Combined Non-
Temporary(T) Difference	Line	Schedule M-1	Consolidated Schedule M-1	Renewable Hawaii, Inc.	Utility Companies
Т		KEAHOLE SETTLEMENT - BOOK	2,550,000	2,550,000	0
Ť		KEAHOLE SETTLEMENT - BOOK	500,000	500.000	0
P		PLANT ACQ ADJ - BOOK	52.141	52,141	0
T		CAPITALIZED EXPENSES	275,819	16,753	259,066
Ť		VACATION - BOOK	43,848	33,336	10,512
Ť		WORKERS COMPENSATION - BOOK	224,004	33,000	191,004
T		ACQ DISCOUNTS & PREMIUMS	103.592	0	103,592
T		AMORT EXPENSE BOOK	492,578	26,903	465,675
Τ		CORE DEPOSITS - BOOK	1,730,400	0	1,730,400
T		VISA LOYALTY POINTS	166,100	0	166,100
Т		MORT SERV RIGHTS - BOOK	2,246,741	0	2,246,741
T		SL LEASE - BOOK	150,000	0	150,000
Т		RETROFIT LEASE - BOOK	35.388	0	35,388
T		LEGAL RESERVE	(36,000)	0	(36,000)
T		FORWARD COMMIT LOANS - LOSS	57,542	0	57,542
T		DISCONTINUED OPERATIONS - BOOK	4,161,655	0	4,161,655
	5d	Total Other	75,629,267	59,790,324	15,838,943
	6	Total lines 1 - 5	700,789,851	317,054,138	383,735,713
	7	Income recorded on books			
_		not included on return			
P	7a	Tax-exempt interest	0	0	0
P		BOOK EQUITY INCOME	285,041,930	29,221,937	255,819,993
P		TAX EXEMPT INTEREST	37,499	0	37,499
T		PROPERTY DISPOSALS - BOOK	172,312	0	172,312
T		GAIN INV SALE	9,834,782	0	9,834,782
T		LOSS INV SALE	(8,482,315)	0	(8,482,315)
T T		CAP GAINS(LOSSES) - BOOK	(113,656)	0	(113,656)
T		CUSTOMER ADVANCES RECEIVED DEFERRED GAIN - BOOK AMORT	26,780	(1,518)	28,298
Ť		LEASE RENT PREMIUM - BOOK AMORT	142,736	142,736	0
Ť		WAIAU WATER WELL - BOOK AMORT	6,845 64,578	6,845 64,578	0
Ť		CAPITALIZED REPAIRS	1,042,442	1,042,442	0
Ť		MBS RETAINED - DISC AMORT	905,444	0	905,444
Т		FEE INCOME - BOOK	1,086,940	ő	1,086,940
T		JV & PARTNERSHIP INCOME OR LOSS - BOOK	(215,407)	ō	(215,407)
T		LOAN FEES AND COSTS	1,241,971	0	1,241,971
Т		RESERVE-UNCOLLECTED INTEREST	241,207	0	241,207
T		FHLB INCOME	5,079,800	0	5,079,800
P		LEVERAGED LEASE INCOME OR LOSS - BOOK	2,003,370	0	2,003,370
T		HONOLULU HARBOR RESERVE	250.000	0	250,000
	7b	Total Other	298,367,258	30,477,020	267,890,238
	8	Deductions on return not			
-	^	charged against book income			
T	8a	Depreciation	141,719,621	126,548,202	15,171,419
T	8b	Contributions carryover	0	0	0
T	8c	Capital Loss Carryover	0	0	0
P		§401(K) FLEX DIVIDEND DEDUCTION	3,204,531	0	3,204,531
P		KEYMAN LIFE INSURANCE	4,756,819	688,537	4,068,282
P		STATE INCOME TAXES - TAX	3.497,682	6.665.457	(3.167,775)
P		STOCK OPTION INCENTIVE PLAN - TAX PERM	476,774	0	476,774
Т		DEFERRED COMP EMPLOYEES - TAX	2,770,538	(2.602)	2,773,140
T		DIRECTORS' COMPENSATION - TAX	99,000	15,000	84,000
T		PENSION - OPEB TAX	9.777.932	9.696,014	81,918
Т		PENSION EXPENSE - TAX	53,719,661	34.874.001	18,845,660

## HAWAIIAN ELECTRIC INDUSTRIES, INC. AND SUBSIDIARIES Consolidating Schedule M-1 12/31/2003

Permanent (P) or Temporary(T) Difference	Line	Schedule M-1	Consolidated Schedule M-1	Combined Utilities and Renewable Hawaii, Inc.	HEI and Combined Non- Utility Companies
Т		PREPAID EXPENSES UNDER §1.461-4(m)	262.605	(2.255)	045.040
Ť		STOCK OPTION INCENTIVE PLAN - TAX TEMP	262,605	(3,355)	265,960
T			1,569,561	0	1,569,561
1 T		VACATION - TAX	17,509	(25,007)	
<u> </u>		AFUDC - DERT	1 914 በ45	1 014 045	n
Т		AFUDC - EQUITY	4,266,766	4,266,766	0
T		AFUDC - EQUITY GROSS UP	2,717,602	2,717,602	0
T		BAD DEBTS - TAX	6,766,220	1.804.007	4,962,213
T		BARBER'S POINT RESERVE	142,462	142,462	0
T		BOND INTEREST DIFFERENTIAL	575,595	575,595	0
T		BOND REDEMPTION COSTS	1.422,108	1,422,108	0
Т		COST OF REMOVAL	8.782,772	8,782,772	0
T		ELECTRIC DISCOUNT TRUST - TAX	(862)	(862)	ŏ
T		ELECTRIC DISCOUNT TRUST - TAX	437,691	437.691	Ö
T		ELECTRIC DISCOUNT TRUST - TAX	(7,451)	(7.451)	0
T		ENERGY SERVICES - TAX	4,438,795	4.438.795	0
T		LOSS ON ABANDONED ASSETS	2.456,878	2,454,660	2,218
T		PENSION - EXCESS PLAN TAX	70,947	62,846	8,101
T		PENSION - SERP TAX	292,119	123,162	168,957
T		WORKERS COMPENSATION - TAX	1,503,488	1.240,784	262,704
T		PROFESSIONAL FEES - TAX	30,146	30,272	(126)
T		INTEREST EXPENSE - TAX	2,905,907	335.979	2,569,928
T		RESERVES - TAX	8,700	8,700	2,507,728
T		RESERVES - OIL CLEANUP	594,286	594,286	0
T		CORE DEPOSITS - TAX	1,635,058	0	1,635,058
T		FRANCHISE TAXES - TAX	13,878,340	0	13,878,340
T		GOODWILL - TAX	4,771,174	0	4,771,174

T		STATE INCOME TAXES - OTHER	164,750	0	164,750
T		AMORT EXPENSE TAX	12,239	3.139	9,100
T		CAPITALIZED STARTUP COSTS	6,910	0	6.910
T		SUBSIDIARY SERVICES	6,756	0	6,756
		Total Other	141,383,420	83,255,403	58.128,017
	9	Total lines 7 - 8	581,470,299	240,280,625	341,189,674
	10	Income (line 28 page 1)	119,319,552	76,773,513	42,546,039

## HAWAIIAN ELECTRIC COMPANY, INC. AND SUBSIDIARIES Consolidating Schedule M-1 12/31/2003

Perm (P) or Temp (T) Difference	Line	Schedule M-1	Combined Utilities and Renewable Hawaii, Inc.	HAWAIIAN ELECTRIC COMPANY, INC.	HAWAII ELECTRIC LIGHT COMPANY, INC.	MAUI ELECTRIC COMPANY, LTD.	RENEWABLE HAWAII, INC.
	1	Net income per books	110,127,979	79,991,039	11,683,137	18,588,341	(134,538)
P	2	Federal income tax	31,935,323	21,303,393	1,216,425	9,415,505	(154,556)
T	3	Excess capital losses over gains	0	0	0	0,413,505	0
	4	Income subject to tax not recorded on books					
Т		DIVIDEND INCOME - TAX	0	0	0	0	
T		CAPITAL GOODS EXCISE TAX CREDIT - TAX	2,746,145	1.470.958	654,281	620,906	0 0
T		PROPERTY DISPOSALS - TAX	2,740.149	0	0,4,281	020,906	
T		CAP GAINS(LOSSES) - TAX	0	0	0	0	0
T		CIAC RECEIVED	1,537,556	398.615	(44,881)	1,183,822	0
T		HAWAII TAX CREDITS - OTHER TAX	107,124	107,124	0	1,165,622	0
T		JV & PARTNERSHIP INCOME OR LOSS - TAX	(78.886)	(78.886)	0	0	0
T		DEFERRED INCOME & FEES	0	0	0	0	0
T		FEE INCOME - TAX	0	0	0	0	0
T		STATE LOW INC HOUSING TAX CREDIT - TAX	0	0	0	0	0
T		INTEREST INCOME - TAX	ő	0	0	0	0
T		IRC §481A ADJUSTMENT	0	0	0	0	0
T		RENT DEPOSIT	0	0	0	0	0
T		RECIP LOAN SALE - LOSS RECAP	Ö	Ö	0	0	0
T		LEVERAGED LEASE INCOME OR LOSS - TAX	0	0	0	0	0
			4,311,939	1,897.811	609,400	1,804.728	0
	5	Expenses recorded on books		1,077,011	005,700	1,004,720	
		not deducted on return					
T	5a	Depreciation	110,791,401	67,216,030	20,354,696	23,220,675	0
Ţ	5b	Contributions carryover	0	0	0	0	ő
Р	5c	Travel and Entertainment	97,172	58,502	18,241	20,429	ŏ
P		CLUB DUES	13,920	12,720	1 200	0	^
P		CURRENT STATE INCOME TAXES	4,785,372	3,377,183	1,200 (115,775)	1 522 064	0
P		DEFERRED FEDERAL TAX EXPENSE	11,603,330	5,547,988	5,043,465	1,523,964 1,011,877	0 0
P		DEFERRED STATE TAX EXPENSE	1,500,121	547,592	943,858	8,671	0
P		EXCESS COMPENSATION EXPENSE	0	0	0	0,071	0
P		LOBBYING	164,021	134,431	14,280	15,310	0
P		STOCK ISSUE COSTS	0	0	14,280	0	0
T		DEFERRED COMP EMPLOYEES - BOOK	580,079	ő	162,741	417,338	0
T		DIRECTORS' COMPENSATION - BOOK	11,096	11.096	0	417,558	0
T		PENSION - OPEB BOOK	11,169,194	8,207,605	1,513,774	1,447,815	0
T		PENSION - SERP BOOK	226.398	231,430	(5,032)	0	0
T		PENSION EXPENSE - BOOK	9,494,479	5,894,495	1.497,951	2,102,033	0
T		STOCK OPTION INCENTIVE PLAN - BOOK	0	0	0	2,102,033	ő
P		POLITICAL CONTRIBUTIONS	500	250	250	ő	ő
P		PREFERRED STOCK ISSUE COSTS	81,976	55,086	16,735	10,155	Ö
T		APPRISE COSTS	2,180,195	1,940,356	0	239,839	ō
T		BAD DEBTS - BOOK	1,714,480	1,122,855	373,371	218,254	0
T		BOND ISSUE EXP - BOOK AMORT	393,775	316,716	49,626	27.433	0
T		CAPITALIZED INTEREST	5,219,019	4,173,055	589.469	456,495	0
T		INTEREST EXPENSE - BOOK	455,506	355,824	99,682	0	0
T		PENSION - EXCESS PLAN BOOK	116,788	112,411	0	4,377	0
T		RESERVES - BOOK	(472,074)	(272.297)	(199,777)	0	0
T		SOFTWARE - BOOK	183,917	(44,870)	200,326	28,461	0
T		EMISSIONS FEE	1.511.394	755,984	297,952	457,458	Ö
Т		AES HI PPA AMENDMENT	163,388	163,388	0	0	0
T		CIS PROJECT	408,877	408.877	0	Ō	ő
P		OTHER PERMANENT DIFFERENCES	(2)	0	(2)	ő	ő
P		PENALTIES AND FINES	763.060	0	(43,600)	806.660	0
T		ENERGY SERVICES - BOOK	4.042.912	0	1,254,866	2,788,046	0
T		PROFESSIONAL FEES - BOOK	196,726	0	196,726	0	0

HAWAIIAN ELECTRIC COMPANY, INC. AND SUBSIDIARIES Consolidating Schedule M-1 12/31/2003

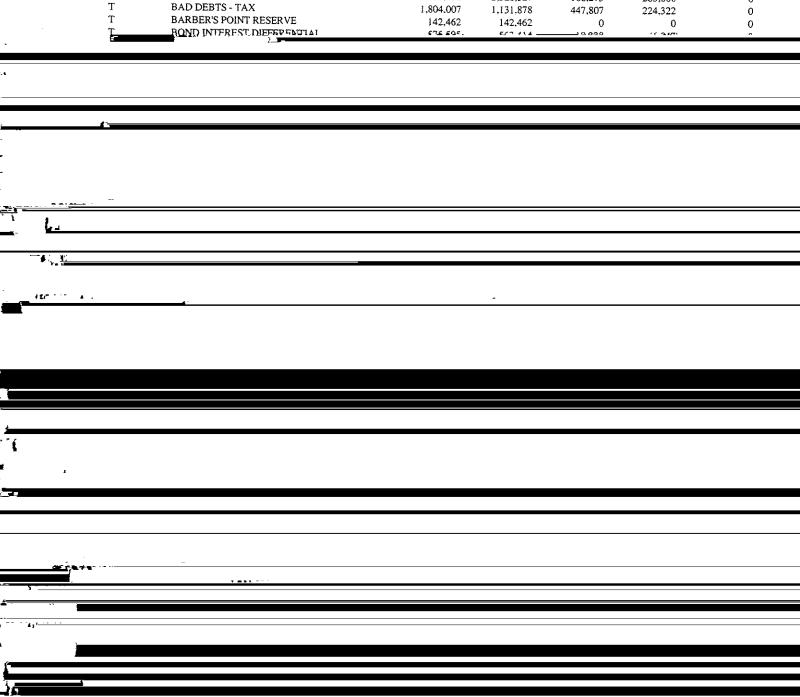
Perm (P) or Temp (T) Difference Line	Schedule M-1	Combined Utilities and Renewable Hawaii, Inc.	HAWAIIAN ELECTRIC COMPANY, INC.	HAWAII ELECTRIC LIGHT COMPANY, INC.	MAUI ELECTRIC COMPANY, LTD.	RENEWABLE HAWAII, INC.
T T	RATE HEARINGS COSTS - BOOK	69,744	0	69,744	.0	0
<u>-</u>						

P	PLANT ACQ ADJ - BOOK	52,141	0	0	52,141	0
T	CAPITALIZED EXPENSES	16,753	0	0	16.753	ñ
T	VACATION - BOOK	33,336	0	Ö	33,336	0
T	WORKERS COMPENSATION - BOOK	33,000	0	0	33,000	Ô
T	ACQ DISCOUNTS & PREMIUMS	0	0	0	0	0
T	AMORT EXPENSE BOOK	26,903	0	0	0	26,903
T	CORE DEPOSITS - BOOK	0	0	0	Ô	0
T	VISA LOYALTY POINTS	0	0	0	0	0
T	MORT SERV RIGHTS - BOOK	0	0	0	0	0
T	SL LEASE - BOOK	0	0	0	0	0
T	RETROFIT LEASE - BOOK	0	0	0	0	0
T	LEGAL RESERVE	0	0	0	0	0
T	FORWARD COMMIT LOANS - LOSS	0	0	0	0	0
T	DISCONTINUED OPERATIONS - BOOK	0	0	0	0	0
50	f Total Other	59,790,324	33,052,175	15,011,830	11,699,416	26,903
6	Total lines 1 - 5	317,054,138	203,518,950	48.893,729	64,749,094	(107,635)

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HAWAIIAN ELECTRIC COMPANY, INC. AND SUBSIDIARIES Consolidating Schedule M-1 12/31/2003

Perm (P) or Temp (T) Difference	Line Schedule M-1	Combined Utilities and Renewable Hawaii, Inc.	HAWAIIAN ELECTRIC COMPANY, INC.	HAWAII ELECTRIC LIGHT COMPANY, INC.	MAUI ELECTRIC COMPANY, LTD.	RENEWABLE HAWAII, INC.
Т	PENSION - OPEB TAX	9,696,014	7.063,555	1.330.617	1,301,842	0
T	PENSION EXPENSE - TAX	34,874,001	23,080,742	6,239,176	5,554,083	0
T	PREPAID EXPENSES UNDER §1.461-4(m)	(3,355)	(34,613)	31,258	0	Ô
T	STOCK OPTION INCENTIVE PLAN - TAX TEMP	0	0	0	0	0
T	VACATION - TAX	(25,007)	(6.716)	(18,291)	Ô	Õ
T	AFUDC - DEBT	1,914,045	1,658,405	79.418	176,222	Ô
T	AFUDC - EQUITY	4,266,766	3,652,445	169,997	444,324	0
T	AFUDC - EQUITY GROSS UP	2.717,602	2,326,327	108,275	283,000	ň
T	BAD DEBTS - TAX	1,804,007	1,131.878	447,807	224,322	ŏ
T	BARBER'S POINT RESERVE	142,462	142,462	0	0	ñ
Ţ	ROND INTEREST DIFFERENTIAL	57£ 50F.	FE7 414 =		11 210	•



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HAWAIIAN ELECTRIC INDUSTRIES, INC. AND SUBSIDIARIES Consolidating Tax Accrual 12/31/2004

	HEI Consolidated	Combined Utilities and Renewable Hawaii, Inc.	HEI and Combined Non- Utility Companies	
Pre-tax Book Income (Loss)  State Permanent Differences:	205,265,441	132,650,062	72,615,379	
Amortization of Capital Stock Expense	80,215	80,215	0	
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## HAWAIIAN ELECTRIC INDUSTRIES, INC. AND SUBSIDIARIES Consolidating Tax Accrual 12/31/2004

	HEI Consolidated	Combined Utilities and Renewable Hawaii, Inc.	HEI and Combined Non- Utility Companies
Interest on Deferred EICP/LTIP	29.044	27.440	
Gains/Losses on Property Dispositions	*	23,448	5,596
Gains/Losses on Substation Land	(1,832,234)	(1,798,098)	(34,136)
HAHF Partnership Income	183,426	183,426	0
Interest on IRS adjustments	432,743	0	432,743
Investment in ASB Realty	557,102	283,902	273,200
Keahole Settlement Payments	485	0	485
LTIP Book Accruals	(660,000)	(660,000)	0
LTIP Payments	1.681,158	492,736	1,188,422
Lease Rent Premium Amortization	(1,262,453)	(379,276)	(883,177)
OPEB Accrual	(4,801) 4,920,220	(4,801)	0
OPEB Contribution	(2,522,669)	4,680,666	239,554
Pension Exp (HEIRS/excess) - Accrual	3,323,448	(2,399,418)	(123,251)
Pension Exp (HEIRS/excess) - Payment	(10.876,197)	(451,563)	3,775,011
PMSR	800,776	(10,000.000)	(876,197)
Prepaids	1,619,524	(123,752)	800,776
Rate Hearing Costs, net	69,744	69.744	1,743,276
Reciprocal Loan Sale	19,437	09,744	0 19,437
Regulatory Assets/Liabilities	38,243	38,243	19,437
Retained Servicing Rights	(166,084)	0 0	(166,084)
Retrofit lease locations	18,213	0	18.213
Rev Bond Cost Amortization	477,785	477.785	10,213
Rev Bond Interest Differential / Amortization	(278,795)	(278,795)	0
SERP Accrual	1,107,319	343,048	764,271
SERP Payment	(71,081)	0	(71.081)
Stock - SOIP Book Exp	1,620,734	Ô	1,620,734
Stock - Restricted Stock	131,668	35.892	95,776
Stock- Stock Option Exercise	(1,598,929)	0	(1,598,929)
Software	494,008	28,333	465,675
Straight line Lease	65,000	0	65,000
Sun Power for Schools	(51,919)	(51,919)	05,000
Team Incentive Plan (TIP)	429,432	429,432	0
Tenant Deposits	(3,001)	0	(3,001)
Uncollected Interest	(57,249)	0	(57,249)
Unrealized Losses	903,170	0	903,170
Vacation Accrual	390,161	40,052	350,109
VISA Loyalty	179,300	0	179,300
Waiau Water Well Amortization	(64,578)	(64,578)	0
Workers Compensation	(275,565)	(275,565)	0
	(14.280,623)	(2,123,989)	(12,156,634)
HAWAII			
STATE PRETAX INCOME:	174.419,232	130,732,110	43,687,122
Less: Net Long-Term Capital Gains	(4,929,749)	0	(4.020.740)
Less: Net Capital Gains Dividends	0	0	(4, <del>9</del> 29,749) 0
	•	v	V
HAWAII			
State Pretax Income Excl. Capital Gains	179,348,981	130,732,110	48,616,871
Less: Hawaii State Income Tax	12,659,459	8,257,657	4,401,802
Add: Hawaii State Capital Goods Credit Add: Net Long-Term Capital Gains	(6,560,617)	(6,551,439)	(9.178)
Add: Net Capital Gains Dividends	0 0	0 0	0 0
HAWAII TAXABLE INCOME	168.320,391	129,025.892	39,294,499

#### 12/31/2004

	HEI Consolidated	Combined Utilities and Renewable Hawaii, Inc.	HEI and Combined Non- Utility Companies
Other States Temporary Differences:			
Other States Tax Deduction	(183,451)		(183,451)
Real Estate Lease Income	5,254,041		5,254,041
Total Other States Temporary Diff	5,070,590	0	5,070,590
Federal Permanent Differences:			
Depreciation	497.062	497.062	0
Exempt Interest	(103.761)	0	(103,761)
Other State Income	374,394	0	374,394
Research Tax Credit - 2003	877,414	877,414	0
52-53 wk 481(a) adj	0	0	0
TOTAL FED PERMANENT DIFFS	1,645,109	1,374,476	270,633
Federal Temporary Differences:			
Fed/State Depreciation Differences	(47,764,284)	(47,717,590)	(46,694)
Franchise Tax Adjustment	6.987,375	0	6,987,375
Ogiethorpe Fed Taxable Income	5,012,017	0	5.012.017
Other Adjustment	30	30	0
IRC §441 Adjustment	25,922,514	0	25,922,514
TOTAL FED TIMING DIFFERENCES	(9.842,348)	(47,717,560)	37,875,212
FEDERAL TAXABLE INCOME	165,193,742	82,682,808	82,510,934
Less: Net Long-Term Capital Gains	(4,929,749)	0	(4,929,749)
Federal Taxable Income Excl. Cap Gains	170,123,491	82,682,808	87,440,683

## HAWAHAN ELECTRIC COMPANY, INC. AND SUBSIDIARIES Consolidating Tax Accrual 12/31/2004

	Combined Utilities and Renewable Hawaii, Inc.	HAWAIIAN ELECTRIC COMPANY, INC.	HAWAII ELECTRIC LIGHT CO.,	MAUI ELECTRIC COMPANY,	RENEWABLE
	x14 # 411, 111C.	1110.	INC.	LTD.	HAWAII, INC.
Pre-tax Book Income (Loss)	132,650,062	79,621,540	20.985.063	32,095,778	(50.210)
State Permanent Differences:		17,021,540	20,900.000	32,093,778	(52,319)
Amortization of Capital Stock Expense	80,215	55,086	14,974	10,155	
Amortization of Plant Acquisition Expense	52,141	22,000	14,214	52,141	
Club Dues	12,569	12,569		22,141	
Excess Comp	54,969	54,969			
Flex Dividend Deduction	0	,-			
Low Income Housing Credits	0				
Keyman Insurance	(647,939)	(560,232)	(41.677)	(46,030)	
Lobbying Expense	166.854	133,943	16.064	16.847	
Franchise Tax Payment	0				
Meals & Entertainment	87,228	46,069	16,563	24,596	
Nonqualified Stock Option Exercise	0		.,		
Oglethorpe Lease Income	0				
Capital Loss	0				
Other State Income	0				
Preferred Dividends	0				
On the street of					

Research Tax Credit Real Estate Partnership/Leveraged Lease Book NI Tax Exempt Interest	400,000 0 0	400,000			
TOTAL STATE PERM DIFFS	206,037	142,404	5,924	57,709	
HAWAII State Temporary Differences:					
AFUDC Equity Incurred	(5,706,202)	(5,225,585)	(74,762)	(405,855)	
AFUDC Debt Incurred	(2,629,622)	(2,312,581)	(162.307)	(154,734)	
AFUDC Equity Grossup	(3,690,171)	(3,328,296)	(103.377)	(258,498)	
Amortization of Acquisition Disc/Prem	O O	(,=,=)	(100,511)	(200,470)	
Amortization of Core Deposit Premium	0				
Amortization of Goodwill	0				
Amortization of Reg Assets/Liabilities	(446.078)	(279,576)		(166.502)	
APPRISE Costs	6,460	(277,010)		6.460	
Bad Debts	(156,773)	(136.047)	19.482	(40,208)	
Note Receivable	0	(/	15.402	(40,200)	
Capitalized Interest	8.040.232	7,664.027	(124,177)	500,382	
Change in Reserve	626.713	794,566	(80.863)	(86,990)	
CIAC	(1,256,066)	684,745	(2,140,531)	199,720	
CIS Project	(95,263)	(95,263)	(=,1 .000,1)	177,120	
Book Gain on Investment Securities	0	(,,			
Customer Advances, net	72,762	0	(98,927)	171.689	
Deferred Income	0	· ·	(>0,>#1)	171,007	
Deferred Loan Fees/Loan Costs	0				
Cost of Removal	(7,658,401)	(5.099,304)	(1,496,369)	(1,062,728)	
Depreciation - Book	116,391,663	69.648.867	22,216,458	24.526.338	
Depreciation - State Tax Basis	(07.050.500)	(50 107 042)	(01.010.100)	(22.052.40.4)	

## HAWAIIAN ELECTRIC COMPANY, INC. AND SUBSIDIARIES Consolidating Tax Accrual 12/31/2004

	Combined Utilities and Renewable Hawaii, Inc.	HAWAIIAN ELECTRIC COMPANY, INC.	HAWAII ELECTRIC LIGHT CO., INC.	MAUI ELECTRIC COMPANY, LTD.	RENEWABLE HAWAII, INC.
Interest on Deferred EICP/LTIP	22.440	** ***			
Gains/Losses on Property Dispositions	23,448	23,448	(0/7.7.13)	(50.000)	
Gains/Losses on Substation Land	(1,798,098)	(1,480,355)	(267,743)	(50,000)	
HAHF Partnership Income	183,426 0	183,426			
Interest on IRS adjustments	283,902	147 105	56.017	70 700	
Investment in ASB Realty	283,902	147,285	56,917	79,700	
Keahole Settlement Payments	(660.000)		(440,000)		
LTIP Book Accruals	492,736	342,053	(660,000) 61,552	90 121	
LTIP Payments	(379,276)	(343,919)	(35,357)	89,131 0	
Lease Rent Premium Amortization	(4,801)	(4,801)	(33,331)	U	
OPEB Accrual	4,680,666	1,940,269	1,432,090	1,308,307	
OPEB Contribution	(2,399,418)	1,5 10,205	(1,257,256)	(1,142,162)	
Pension Exp (HEIRS/excess) - Accrual	(451,563)	(1,546,921)	76,335	1.019,023	
Pension Exp (HEIRS/excess) - Payment	(10,000,000)	(5,500,000)	(2,250.000)	(2.250,000)	
PMSR	0	* * * * * * * * * * * * * * * * * * * *	(=,=+++++++)	(=1,500,000)	
Prepaids	(123,752)	(123,752)			
Rate Hearing Costs, net	69,744	0	69,744		
Reciprocal Loan Sale	0				
Regulatory Assets/Liabilities	38,243		38,243		
Retained Servicing Rights	0				
Retrofit lease locations	0				
Rev Bond Cost Amortization	477,785	362,746	33.997	81.042	
Rev Bond Interest Differential / Amortization	(278,795)	(303,044)	18,202	6,047	
SERP Accual	343,048	349,868	(6,820)		
SERP Payment	0				
Stock - SOIP Book Exp Stock - Restricted Stock	0				
Stock - Restricted Stock Stock- Stock Option Exercise	35,892	35,892			
Software	0	(40.507)	95.155		
Straight line Lease	28,333	(48,527)	75.155	1,705	
Sun Power for Schools	0 (51,919)		(2.21%)	(40 700)	
Team Incentive Plan (TIP)	429,432	245 000	(3,217)	(48,702)	
Tenant Deposits	429,432	245,900	114,632	68,900	
Uncollected Interest	Ö				
Intestigad Lacrae	•				
Vacation Accrual	40,052	6.716		33,336	
VISA Loyalty	0	<b>0</b> ,0		33,330	
Waiau Water Well Amortization	(64,578)	(64,578)			
Workers Compensation	(275,565)	(65,334)	107,775	(318,006)	
	(2,123,989)	4,108,700	(5,917,867)	(314,822)	0
HAWAII STATE PRETAX INCOME:	130,732.110	83.872,644	15.073,120	31,838,665	(52,319)
Less: Net Long-Term Capital Gains Less: Net Capital Gains Dividends	0 0				
HAWAII State Pretax Income Excl. Capital Gains	130,732,110	83,872,644	15,073,120	31,838,665	(52,319)
					(24,217)
Less: Hawaii State Income Tax	8,257,657	5,237,182	1,070,323	1,953,299	(3,147)
Add: Hawaii State Capital Goods Credit Add: Net Long-Term Capital Gains Add: Net Capital Gains Dividends	(6,551.439) 0 0	(3.195,500)	(2,721,008)	(634,931)	
and the second s	∀				
HAWAII TAXABLE INCOME	129,025.892	81,830.962	16,723,805	30,520,297	(49,172)

#### CA-IR-91 DOCKET NO. 04-0113 PAGE 19 OF 19

## HAWAIIAN ELECTRIC COMPANY, INC. AND SUBSIDIARIES Consolidating Tax Accrual 12/31/2004

Other States Temporary Differences:         Other States Tax Deduction         Real Estate Lease Income         Total Other States Temporary Diff       0       0       0       0         Federal Permanent Differences:         Depreciation       497,062       497,062       497,062         Exempt Interest       0       0       0         Other State Income       0       0       0         Research Tax Credit - 2003       877,414       877,414       877,414         52-53 wk 481(a) adj       0       0       0         TOTAL FED PERMANENT DIFFS       1,374,476       877,414       497,062       0         Federal Temporary Differences:         Fed/State Depreciation Differences       (47,717,590)       (29,844,198)       (9,587,562)       (8,285,830)         Franchise Tax Adjustment       0       0       0       0       0       0	
Federal Permanent Differences:   Depreciation	
Depreciation         497,062         497,062           Exempt Interest         0         0           Other State Income         0         0           Research Tax Credit - 2003         877.414         877,414           52-53 wk 481(a) adj         0         0           TOTAL FED PERMANENT DIFFS         1,374,476         877,414         497,062         0           Federal Temporary Differences:           Fed/State Depreciation Differences         (47,717,590)         (29.844,198)         (9,587,562)         (8,285,830)           Franchise Tax Adjustment         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0<	
Depreciation         497,062         497,062           Exempt Interest         0         0           Other State Income         0         0           Research Tax Credit - 2003         877.414         877,414           52-53 wk 481(a) adj         0         0           TOTAL FED PERMANENT DIFFS         1,374,476         877,414         497,062         0           Federal Temporary Differences:           Fed/State Depreciation Differences         (47,717,590)         (29.844,198)         (9,587,562)         (8,285,830)           Franchise Tax Adjustment         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0<	
Research Tax Credit - 2003	
Federal Temporary Differences: Fed/State Depreciation Differences Franchise Tax Adjustment  (47,717.590) Franchise Tax Adjustment  (9,587,562) Franchise Tax Adjustment	
Federal Temporary Differences: Fed/State Depreciation Differences (47,717.590) (29.844,198) (9,587,562) (8,285,830) Franchise Tax Adjustment (9,587,562)	0
Oglethorpe Fed Taxable Income	J
Other Adjustment         30         30           IRC §441 Adjustment         0         30	
TOTAL FED TIMING DIFFERENCES (47,717,560) (29,844,198) (9,587,532) (8,285,830)	0
FEDERAL TAXABLE INCOME 82.682,808 52.864,178 7.633,335 22,234,467	(49,172)
Less: Net Long-Term Capital Gains 0 0 0	
Federal Taxable Income Excl. Cap Gains 82,682,808 52,864,178 7,633,335 22,234,467	

CA-IR-92

#### Ref: T-18, page 18, line 8.

Please explain all reasons why the Company's expenses are thought to be subject to inflation at the same rate as the Consumer Price Index ("CPI"), rather than some other measure of inflation and provide the following information:

- a. Identify and describe any indicators of inflation other than CPI that were considered for use by HECO in projecting expenses, explaining the reasons for rejection of each alternative to CPI that was considered.
- b. State whether HECO has any studies, reports, analysis, workpapers or other information supportive of the Company's apparent conclusion that the CPI measure of inflation is applicable to the specific basket of goods and serviced purchased by HECO.
- c. If the response to part (b) is affirmative, please provide complete copies of all documents associated with your response to part (b).
- d. State whether HECO believes that its management and employees are able to achieve any improvements in efficiency or productivity that serve to offset the impact of inflation upon the Company.
- e. Provide complete copies of all documents associated with your response to part (d).

#### **HECO Response:**

In developing non-labor estimates, forecasters were instructed to use information available for their specific cost item. When specific prices, inflation rates, or cost indices are not available, a general inflation factor, based on an estimate of CPI, would be used. As shown on HECO-1811, a relatively small portion of the Company's non-labor estimates were based on the general inflation factor.

- a. For its general inflation factor, which is used only when specific prices or cost indices are not available, the Company did not consider any indicator of inflation other than the CPI.
- b. The requested information was not performed or prepared and, therefore, not available.
- c. Not applicable.
- d. The Company continually strives to achieve improvements in efficiency and productivity.

CA-IR-92 DOCKET NO. 04-0113 PAGE 2 OF 2

_	Improvements in efficiency, where applicable, should be reflected in the work force
	Every contract to an add to the second of th
realises.	
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	Company's non-labor forecast as it is generally one of the factors that is considered in the

impact of productivity to consider price increases caused by other factors.

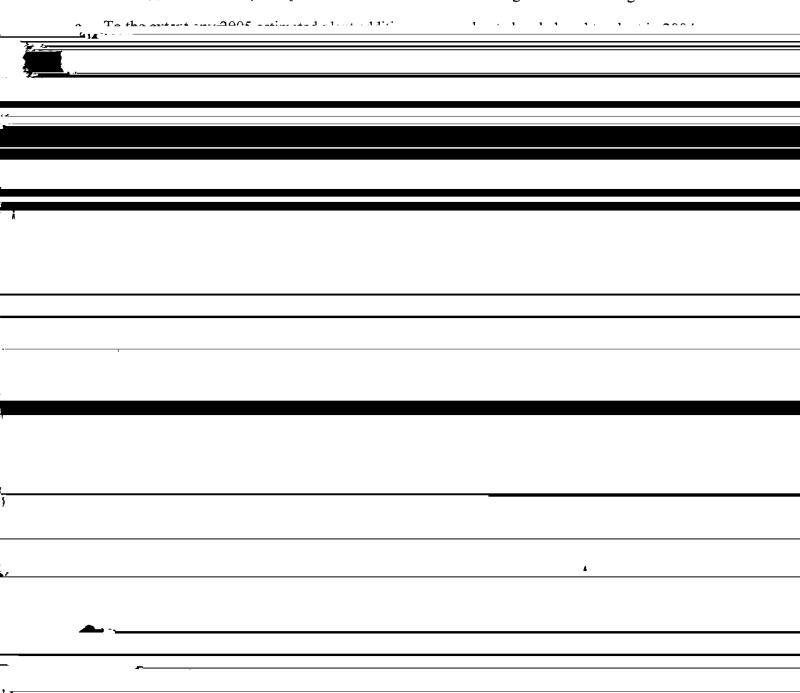
e. Not applicable.

#### **CA-IR-93**

#### Ref: HECO-1803 Projects Included in Plant Additions.

Please provide the following:

- a. For each 2004 estimated plant addition, please provide the actual in-service cost and inservice date.
- b. To the extent that a particular project was expected to be closed to plant in service during 2004, but for any reason was delayed, please provide a narrative description for the reason(s) for such delay and provide revised estimates of closing costs and closing dates.



CA-IR-93 DOCKET NO. 04-0113 PAGE 2 OF 4

Y00045 Ocean Pointe Subdivision

P9454000 K4 Boiler Controls Upgrade

#### HAWAIIAN ELECTRIC COMPANY, INC.

#### PROJECTS OVER \$500,000 (OR \$2,500,000 EFFECTIVE July 1, 2004)

#### (\$ THOUSANDS)

				(1)	(2)
					IN-SERVICE
<u>DOCKET</u>	<u>D&amp;O</u>			<b>IN-SERVICE</b>	COST a/o
<u>NO.</u>	<u>NO.</u>	<u>ITEM</u>	DESCRIPTION	DATE	12/31/2004
01-0272	19142	P0000078	Kahe 5 Boiler Controls Upgrade	5/15/2004	\$3,415
01-0189	18660	P0000143	Salt Lake Boulevard Widening Ph 2	(WIP)	see page 3
01-0419	19138	P0000288	Emma 4kV Conversion	4/26/2004	539
03-0036	20473	P0000423	Kailua Rd UG	8/1/2004	535
04-0051	21124	P0000454	K6 Fan Enclosure	(WIP)	
01-0135	18680	P0000474	Waialua Sugar Privatization	(WIP)	see page 3
03-0362	20789	P0000493	Waiau 6 Turbine Blades	(WIP)	see page 3
01-0274	20436	P0000507	Kam Hy Resurf Waiahole-Cr Ln	8/30/2004	1,989
04-0109	21416	P0000658	W9 Exhaust Duct Replacement	(WIP)	·
04-0064	21105	P0000667	Kahe Sewer System Upgrade	(WIP)	
03-0135	20380	P0000669	Kakaako ID10	9/9/2004	533
03-0157	20462	P0000750	Kahe 5 Reheater Element Replace	5/15/2004	1,584
03-0074	20235	P0000769	2003 Spare 138-46kV Transformer	3/17/2004	957
03-0107	20406	P0000774	Kukui Gardens Conversion	(WIP)	
03-0220	20626	P0000832	Waiau 3 Main Transformer Replace	10/8/2004	889
03-0154	20390	P0000863	Kahe 4 Generator Rotor Rewind	2/1/2004	807
04-0021	20918	P0000886	Wal-Mart Sam's Keeaumoku	9/15/2004	1,162
04-0104	(B)	P0000939	Waiau CT Separation		.,
04-0054	21359	P0000942	Waiau Tank 4 Bottom Replacement	12/4/2004	1,040
02-0207	19775	P9454000	K4 Boiler Controls Upgrade	(WIP)	1,0.0
01-0228	(B)	Y00017	Waikiki Rehab Project 1	( )	
03-0260	21003	Y00021	New Kuahua Substation	(WIP)	
00-0040	18292	Y00023	Ward Air Conditioning Replace	(WIP)	
02-0142	19915	Y00027	Mokuone Substation (P0000563) (see page 3)	12/2/2004	1,346
03-0124	20407	Y00029	Telecommunications System (P0000710)	12/7/2004	1,947
01-0444	19875	Y00032	Waiau Fuel Oil Pipeline	12/6/2004	38,652
(A)		Y00038	Kakaako Makai 25kV Duct Lines		50,032
04-0350	(B)	Y00039	Mamala Substation		
04-0278	(B)	Y00040	Ford Island Substation		
(A)	` '	Y00045	Ocean Pointe Substation		
02-0413	20089	Y00047	Puuloa Road Widening (P9903000)	8/1/2004	1,372
			<b>~</b> `		-,

<sup>(</sup>A) Application not yet filed

<sup>(</sup>B) Awaiting Decision and Order

<sup>(</sup>WIP) Work In Progress

#### HAWAIIAN ELECTRIC COMPANY, INC.

#### (\$ THOUSANDS)

<u>ITEM</u>	DESCRIPTION	REASONS FOR DELAY	Current Cost Estimate	Current In-Service Date Estimate
P0000143	Salt Lake Boulevard Widening Ph 2	The delay is due to the unanticipated delay by the City to start construction on this project. (The construction bid awarded by the City was challenged by one of the bidders.) See HECO's letter to the Commission dated July 11, 2002 in Docket No. 01-0189 for additional information. HECO is near completion.	\$6,015	Feb-05
P0000474	Waialua Sugar Privatization	The delay in the installation of the customer's metering equipment by the customer for Segment 13 prevented HECO from working on other segments downstream from Segment 13 and completing the project in 2004. Segment 13 needed to be completed and cutover to HECO's system before HECO could work on the remaining segments. The customer's metering equipment for Segment 13 was installed in November 2004, and HECO completed work on this segment in December 2004. HECO is now currently working on the remaining segments and anticipates completing the project in May 2005.	1,603	May-05
P0000493	Wajau 6 Turbine Blades	The Waiau 6 unit maintenance overhaul was	1 502	Δ rsp. 05

#### CA-IR-94

#### Ref: HECO-1801.

Please provide the actual 2004 plant addition amounts by categories of "Projects" and "Programs" as shown on HECO-1801.

#### **HECO Response:**

The actual 2004 plant additions amount by categories are:

Categories	<u>\$ in 000s</u>
Projects	\$86,168
Programs	\$60.410

#### CA-IR-95

#### Ref: HECO-1901.

Please provide the actual 12/31/2004 balances that are shown on an estimated basis for 12/31/2004 on HECO-1901, with the exception of "Working Cash at Present Rates."

HECO Response:

See attached.

CA-IR-95 DOCKET NO. 04-0113 PAGE 2 OF 4

(REVISED 6-17-05)

#### Hawaiian Electric Company, Inc.

#### **Rate Base**

(\$ in thousands)

Investment in Assets	Actual		
Serving Customers	<u>12/31/2004</u>		
Net Cost of Plant in Service	1,241,908		
Property Held for Future Use	599		
Fuel Inventory	39,420		
Materials & Supplies Inventories	10,425	Α	
Unamortized Net SFAS 109			
Regulatory Asset	50,082		•
Prepaid Pension Asset	81,085		
Unamortized OPEB Regulatory Asset	10,415		
Unamortized System Development Costs	0		
Funds from Non-Investors Unamortized CIAC Customer Advances Customer Deposits Accumulated Deferred Income Taxes Unamortized ITC Unamortized Gain on Sales OPEB Liability	144,322 1,519 5,066 162,314 15,166 489 10,390		12/31/04 balance was revised to exclude the following items in the calculation of the Accumulated Deferred Income Taxes for ratemaking purposes: Waiau Water Well cost; EEO Claims; and the executive life portion of the OPEB balance [see DOD-IR-4-4, subpart (c) of these items]. The 12/31/04 balance of \$162,314K reflects the Federal & State accumulated deferred taxes as of 12/31/04, per DOD-IR-4-4. The Federal accumulated deferred taxes is \$140,715K (\$81,150K + \$59,565K, per DOD-IR-4-4, p. 26), and the State accumulated deferred taxes is \$21,599 (\$14,570K + \$7,029, per DOD-IR-4-4, p.32).

A Includes adjustment to Materials & Supplies Inventory related to Accounts Payable of \$618,000. (Refer to CA-IR-95, pages 3 and 4).

CA-IR-95 DOCKET NO. 04-0113 PAGE 2 OF 4

Hawaiian Electric Company, Inc.

#### **Rate Base**

(\$ in thousands)

Investment in Assets

Serving Customers

Net Cost of Plant in Service
Property Held for Future Use
Fuel Inventory

Meaning Property

1,241,908

39,420

# Hawaiian Electric Company, Inc. Materials & Supplies Inventory (\$ in thousands)

	12/31/2004	HECO Reference
Production Inventory	5,489	Recorded 2004
Transmission & Distribution Inventory	5,554	Recorded 2004
Total Materials & Supplies	11,043	
Adjustment to Materials & Supplies Inventory related to Accounts Payable	(618)	CA-IR-95, p.4
Adjusted Total for Materials & Supplies	<del>,</del>	
Inventory	10,425	

Hawaiian Electric Company, Inc.

Estimate of Materials & Supplies Inventory Adjustment for Goods Received but not yet Paid for by the Company (\$ in thousands)

2004	Mat Supplie	TIONS to erials & es Inventory ecount	HECO Reference
Production Inventory	\$	4,473	2004 Recorded
Transmission & Distribution Inventory		7,086	2004 Recorded
Total	\$	11,559 (a)	
Average Daily Additions to Inventory (a)/365 days		32 (b)	
Materials & Supplies Inventory Payment Lag Days		19.5 (c)	WP-1903, p.3
Estimate of Materials & Supplies Inventory Adjustment for Goods RECEIVED but NOT YET PAID for by the Company	\$	618 = ( t	o)x(c)

CA-IR-96 DOCKET NO. 04-0113 PAGE 1 OF 2

CA-IR-96

#### Ref: HECO-1902.

For each "ESTIMATED CHANGE" in 2004 shown, please provide such change on an actual basis, including year-end 2004 balances by category shown.

#### HECOs Response:

See attached.

## Hawaiian Electric Company, Inc. Net Cost of Plant in Service (\$ in thousands)

	Original Cost	Accum Deprec	Removal Reg <u>Liability</u>	Net Plant In <u>Service</u>
Recorded Balances - 12/31/03	2,108,795	(821,485)	(118,110)	1,169,200
CHANGES in 2004:				
Net Plant Additions	146,577			146,577
Cost of Removal			4,773	4,773
Salvage			(279)	(279)
Depreciation Accrual		(78,315)	,	(78,315)
Deprec Accrual Reclass related				` , ,
to Cost of Removal 1		18,299	(18,299)	0
Retirements <sup>2</sup>	(25,355)	25,355		0 .
Net adjustments	(48)	<b>,</b>		(48)
Recorded Balances - 12/31/04	2,229,969	(856,146)	(131,915)	1,241,908

<sup>&</sup>lt;sup>1</sup> Represents the amount of removal costs that has been included in the depreciation expense that will be reclassified as a liability for financial statement purposes.

 $<sup>^{2}</sup>$  Original cost of estimated retirements for the respective year.

CA-IR-97

#### Ref: HECO-WP-1903.

Please provide the actual 12/31/04 ending balance by categories shown on an estimated basis at 12/31/04 on page 2.

#### **HECO** Response:

The actual 12/31/04 ending balance is as follows:

Production Inventory

\$5,489k

Transmission & Distribution Inventory

\$5,554k

CA-IR-98 DOCKET NO. 04-0113 PAGE 1 OF 2

#### CA-IR-98

#### Ref: HECO-1904.

Please provide the actual 2004 accruals and payments that are comparable to those shown on an estimated basis for calendar year 2004.

#### **HECO Response**:

See attached.

CA-IR-98 DOCKET NO. 04-0113 PAGE 2 OF 2

#### Harroiton Elastria Commoner Inc

### **Prepaid Pension Asset**

(\$ in thousands)

RECORDED BALANCE - 12/31/03	64,352
Accrual	1,547
Payments	15,186
RECORDED BALANCE - 12/31/04	81,085

NOTE: Totals may not add exactly due to rounding.

CA	TD	-99
1./	- I K	-99

Kei: ried	UU-1900.		

transactions/balances shown on an estimated basis for 2004.

HECO Response:

See attached.

CA-IR-99 DOCKET NO. 04-0113 PAGE 2 OF 2

## Hawaiian Electric Company, Inc. Unamortized Contributions In Aid of Construction (\$ in thousands)

RECORDED BALANCE - 12/31/03	143,814
CHANGES in 2004:	
Cash Receipts	4,135
In-Kind Receipts	3,608
Transfer from Advances	52
Amortization	(7,287)
RECORDED BALANCE - 12/31/04	144,322

NOTE: Totals may not add exactly due to rounding.

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	- ,		

CA-IR-100

#### Ref: T-22, page 11, line 16.

According to the witness, "HECO prepares both methods in its cost-of-service study for this proceeding, using the recorded distribution plant data for 1985-2003." Please provide the following:

- a. Explain the specific assumptions employed for each method (minimum system / zero intercept).
- b. Provide complete copies of all data employed for each method.
- c. Explain how the results are interpreted, weighted together (between two methods) and inserted into the classification of each distribution plant account.

#### **HECO Response:**

- a. The minimum system method classifies the minimum size facility, e.g. minimum size pole, as customer-related costs. Under this method, the cost of the minimum size plant as percentage of the total plant costs represents the customer-related component. The zero intercept method estimates the portion of the plant related to a no-load situation and classifies this portion as customer-related costs. Under this method, the no-load plant portion is based on the intercept value of the regression analysis relating cost and plant size, and the intercept value as a percent of the total plant costs represents the customer-related component.
- b. Please see HECO-WP-2202, pages 147 to 172. Also see attached.
- c. See response to part (a) above. Also see the input tabs "HPVSDAT" and "Pri VS Sec Dist lines P1" in the electronic file copy of the embedded cost of service study program file ("HECO\_TY\_2005\_COS\_Run\_2\_Filed\_Copy.xls") provided to the Consumer Advocate on January 11, 2005.

5.105

HECO DISTRIBUTION POLES: AVERAGE REPLACED COST VS HEIGHT

Um Introept

#### The GLM Procedure

Pendent Variable: TOTRUC

					of						
Source			DF	Squa	ires	Mean :	Square	F	Value	Pr > F	
Model			1	7585857	'.51	7585	857.51		13.49	0.0063	
Error			8	4497406	3. 15	562	175.77				
Corrected	Total		9	12083263	1.66						
	R	-Square	Coeff	Var	Root M	SE	TOTRUC	Mean			
	o	.627799	26.16	6336	749.78	38	2865	.778			
				_							
Source			DF	Type 1	SS	Mean	Square	F	Value	Pr > F	
SIZE			1	7585857	512	75858	57.512		13.49	0.0063	
Source			DF	Type III	SS	Mean :	Square	F	Value	Pr > F	
SIZE			1	7585857	512	75858	57.512		13.49	0.0063	
5			Cationt	_	Standar	_	Malua	<b>5</b>			
,	aramete	) I ·	Estimate	<del>5</del>	Erro	ir t	Value	۲r	` >  t		
1	ntercep	ot -318	B.1601557	7 898	. 603823	3	-0.35		0.7324		
S	IZE	60	0.6464469	9 16	. 509696	2	3.67		0.0063		

Min Intercept

## HECO UNDERGROUND COPPER PRIMARY DISTRIBUTION CONDUCTORS AVERAGE REPLACEMENT COST VS AMP CAPACITY

#### The GLM Procedure

Dependent Variable: TOTRUC

ndent Variat	Te: IOIKOC							
Source		DF	Sum of Squares	Mean	Square	F Va	lue Pr > F	
Model		1 1	333.979131	1333	.979131	26	.69 0.0067	
Error		4	199.942455	49	.985614			
Corrected	Total	5 1	533.921586					
	R-Squar	e Coeff V	ar Roo	t MSE	TOTRUC	Mean		
	0.86965	3 35.059	65 7.0	70050	20.	16577		
Source		DF	Type I SS	Mean	Square	F Va	ilue Pr > F	:
SIZE		1 1	333.979131	1333	.979131	26	0.0067	•
Source		DF 1	ype III SS	Mean	Square	F Va	ılue Pr > F	=
SIZE		1 1	1333.979131	1333	.979131	26	3.69 0.0067	7
			Sta	ndard				
	Parameter	Estimate			t Value	Pr >	•  t	
	Intercept SIZE	-13.18428900 0.14111452	7.071 0.027		-1.86 5.17		. 1357 . 0067	

### HECO UNDERGROUND SECONDARY DISTRIBUTION CONDUCTORS AVERAGE REPLACEMENT COST VS AMP CAPACITY FOR SELECTED SIZES

THREE-CONDUCTOR COPPER

13:08 Thursday, August 5, 2004

#### The GLM Procedure

Dependent Variable: TOTRUC

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1 1	43.4308772	143.4308772	5.67	0.0976
Error	3	75.9333184	25.3111061		
Corrected Total	4 4	219.3641955			
R-5	Square Coeff \	/ar Root	MSE TOTRUC	iean	
0.6	553848 46.12	721 5.00	31014 10.9	0682	
Source	DF	Type I SS	Mean Square	F Value	Pr > F
SIZE	1	143.4308772	143.4308772	5.67	0.0976
Source	DF	Type III SS	Mean Square	F Value	Pr > F
SIZE	1	143.4308772	143.4308772	5.67	0.0976
		Stan	dard		
Parameter	Estimate	E	rror t Value	Pr >  t	
Intercept SIZE	8801076011 0.0463322820			0.8817 0.0976	

#### HECO COST ANALYSIS FOR 25 KVA OVERHEAD 1 PHASE TRANSF

Modestedopotetedecopereceptas a consequence de conseq

	H-W COS	T INDEX	INST	TALLED	REPLACEMENT	UNIT	COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED	REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
1985	218	1.18	325	614,545	724,487	1,890.91	2,229.19
1986	220	1.17	682	1,160,612	1,355,806	1,701.78	1,987.99
1987	216	1.19	562	822,694	978,854	1,463.87	1,741.73
1988	216	1.19	483	785,922	935,102	1,627.17	1,936.03
1989	226	1.14	467	801,655	911,617	1,716.61	1,952.07
1990	231	1.11	433	405,179	450,784	935.75	1,041.07
1991	231	1.11	381	692,220	770,132	1,816.85	2,021.34
1992	236	1.09	442	801,539	872,862	1,813.44	1,974.80
1993	237	1.08	480	904,606	980,944	1,884.60	2,043.63
1994	243	1.06	416	807,781	854,320	1,941.78	2,053.65
1995	235	1.09	447	1,033,484	1,130,236	2,312.04	2,528.49
1996	237	1.08	387	911,408	988,320	2,355.06	2,553.80
1997	225	1.14	368	844,761	964,905	2,295.55	2,622.02
1998	228	1.13	501	1,010,481	1,139,007	2,016.93	2,273.47
1999	228	1.13	407	958,485	1,080,398	2,355.00	2,654.54
2000	231	1.11	341	803,055	893,442	2,355.00	2,620.06
2001	238	1.08	405	953,775	1,029,917	2,355.00	2,543.00
_3000	OEA	1 00	954	gne ene	040 750	n nee 00	0 400 04

2003 257 1.00 247 581,685 581,685 2,355.00 2,355.00 TOTAL FOR 19 YEARS 8125 15,720,492 17,492,565 1,934.83 2,152.93

#### HECO COST ANALYSIS FOR 37.5 KVA OVERHEAD 1 PHASE TRANSF

	H-W COS	T INDEX	INST	ALLED	REPLACEMENT	UNIT	COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED	REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
1985	218	1.18	108	214,070	252,367	1,982.13	2,336.73
1986	220	1.17	183	361,971	422,848	1,977.98	2,310.64
1987	216	1.19	186	329,812	392,415	1,773.18	2,109.76
1988	216	1.19	146	273,591	325,523	1,873.91	2,229.61
1989	226	1.14	87	184,361	209,649	2,119.09	2,409.76
1990	231	1.11	252	309,557	344,399	1,228.40	1,366.66
1991	231	1.11	144	301,098	334,988	2,090.96	2,326.30
1992	236	1.09	211	427,619	465,670	2,026.63	2,206.97
1993	237	1.08	227	469,560	509,185	2,068.55	2,243.11
1994	243	1.06	232	488,010	516,126	2,103.49	2,224.68
1995	235	1.09	225	585,221	640,008	2,600.98	2,844.48
1996	237	1.08	238	640,745	694,816	2,692.21	2,919.40
1997	225	1.14	188	493,319	563,480	2,624.04	2,997.23
1998	228	1.13	140	322,777	363,832	2,305.55	2,598.80
1999	228	1.13	175	471,100	531,021	2,692.00	3,034.40
2000	231	1.11	200	538,400	598,999	2,692.00	2,995.00
2001	238	1.08	166	446,872	482,547	2,692.00	2,906.91
2002	250	1.03	109	293,428	301,644	2,692.00	2,767.38
2003	257	1.00	94	253,048	253,048	2,692.00	2,692.00
TOTAL	FOR 19	YEARS	3311	7,404,559	8,202,564	2,236.35	2,477.37

### HECO COST ANALYSIS FOR 50 KVA OVERHEAD 1 PHASE TRANSF

CHARACHTER CONTRACTOR

ACCONTRACTOR CONTRACTOR AND CONTRACT

	H-W COS	T INDEX	INST	ALLED	REPLACEMENT	UNIT	COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED	REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
1985	218	1.18	131	351,262	414,102	2,681.39	3,161.09
1986	220	1.17	214	428,575	500,654	2,002.69	2,339.50
1987	216	1.19	256	485,187	577,283	1,895.26	2,255.01
1988	216	1.19	238	484,273	576,195	2,034.76	2,420.99
1989	226	1.14	172	410,394	466,687	2,386.01	2,713.30
1990	231	1.11	206	263,610	293,280	1,279.66	1,423.69
1991	231	1.11	218	508,484	565,716	2,332.50	2,595.03
1992	236	1.09	242	524,035	570,665	2,165.43	2,358.12
1993	237	1.08	264	610,799	662,343	2,313.63	2,508.88
1994	243	1.06	210	485,101	513,049	2,310.00	2,443.09
1995	235	1.09	196	559,902	612,318	2,856.64	3,124.07
1996	237	1.08	237	682,956	740,589	2,881.67	3,124.85
1997	225	1.14	198	556,230	635,338	2,809.24	3,208.78
1998	228	1.13	216	553,147	623,503	2,560.87	2,886.59
1999	228	1.13	217	625,394	704,940	2,882.00	3,248.57
2000	231	1.11	230	662,860	737,468	2,882.00	3,206.38
2001	238	1.08	209	602,338	650,424	2,882.00	3,112.08
2002	250	1.03	160	461,120	474,031	2,882.00	2,962.70
2003	257	1.00	184	530,288	530,288	2,882.00	2,882.00
					*****	*****	
TOTAL	FOR 19	YEARS	3998	9,785,955	10,848,875	2,447.71	2,713.58

# HECO COST ANALYSIS FOR 75 KVA OVERHEAD 1 PHASE TRANSF

indigration in the control

	H-W COS	T INDEX	INSTA	LLED	REPLACEMENT	UNIT (	COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED	REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
1985	218	1.18	25	73,203	86,299	2,928.12	3,451.96
1986	220	1.17	37	69,155	80,786	1,869.05	2,183.39
1987	216	1.19	72	180,198	214,402	2,502.75	2,977.81
1988	216	1.19	53	143,439	170,666	2,706.40	3,220.11
1989	226	1.14	65	213,369	242,636	3,282.60	3,732.87
1990	231	1.11	33	75,406	83,893	2,285.03	2,542.22
1991	231	1.11	65	183,421	204,066	2,821.86	3,139.47
1992	236	1.09	39	103,427	112,630	2,651.97	2,887.96
1993	237	1.08	44	117,994	127,951	2,681.68	2,907.98
1994	243	1.06	35	105,198	111,259	3,005.66	3,178.82
1995	235	1.09	43	127,084	138,981	2,955.44	3,232.12
1996	237	1.08	56	177,129	192,077	3,163.02	3,429.94
1997	225	1.14	39	120,243	137,344	3,083.15	3,521.65
1998	228	1.13	41	111,066	125,193	2,708.93	3,053.48
1999	228	1.13	40	126,520	142,612	3,163.00	3,565.31
2000	231	1.11	64	202,432	225,217	3,163.00	3,519.01
2001	238	1.08	51	161,313	174,191	3,163.00	3,415.51
2002	250	1.03	68	215,084	221,106	3,163.00	3,251.56
2003	257	1.00	59	186,617	186,617	3,163.00	3,163.00
							0.005.50
TOTAL	L FOR 19	YEARS	92 <del>9</del>	2,692,298	2,977,927	2,898.06	3,205.52

### HECO COST ANALYSIS FOR 100 KVA OVERHEAD 1 PHASE TRANSF

	H-W COS	T INDEX	INST	ALLED	REPLACEMENT	UNIT	COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED	REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
1985	218	1.18	17	59,380	70,003	3,492.94	4,117.83
1986	220	1.17	36	102,300	119,505	2,841.67	3,319.58
1987	216	1.19	35	93,784	111,586	2,679.54	3,188.16
1988	216	1.19	18	54,474	64,814	3,026.33	3,600.78
1989	226	1.14	23	64,421	73,258	2,800.91	3,185.11
1990	231	1.11	15	31,001	34,490	2,066.73	2,299.35
1991	231	1.11	18	56,853	63,252	3,158.50	3,514.00
1992	236	1.09	23	69,584	75,776	3,025.39	3,294.60
1993	237	1.08	23	76,668	83,138	3,333.39	3,614.69
1994	243	1.06	16	64,779	68,511	4,048.69	4,281.95
1995	235	1.09	32	129,738	141,884	4,054.31	4,433.87
1996	237	1.08	4	15,083	16,356	3,770.75	4,088.96
1997	225	1.14	3	11,027	12,595	3,675.67	4,198.43
1998	228	1.13	13	41,986	47,326	3,229.69	3,640.49
1999	228	1.13	6	22,626	25,504	3,771.00	4,250.64
2000	231	1.11	12	45,252	50,345	3,771.00	4,195.44
2001	238	1.08	20	75,420	81,441	3,771.00	4,072.05
2002	250	1.03	15	56,565	58,149	3,771.00	3,876.59
2003	257	1.00	16	60,336	60,336	3,771.00	3,771.00
						********	*****
TOTAL	FOR 19	YEARS	345	1,131,277	1,258,268	3,279.06	3,647.15

# HECO COST ANALYSIS FOR 167 KVA OVERHEAD 1 PHASE TRANSF

	H-W COS	T INDEX	INSTA	LLED	REPLACEMENT	UNIT (	COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED	REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
1985	218	1.18	17	75,661	89,197	4,450.65	5,246.86
1986	220	1.17	25	124,665	145,631	4,986.60	5,825.26
1987	216	1.19	12	45,687	54,359	3,807.25	4,529.92
1988	216	1.19	28	107,890	128,369	3,853.21	4,584.61
1989	226	1.14	28	113,546	129,121	4,055.21	4,611.46
1990	231	1.11	42	127,114	141,421	3,026.52	3,367.17
1991	231	1.11	29	109,728	122,078	3,783.72	4,209.60
1992	236	1.09	14	55,007	59,902	3,929.07	4,278.69
1993	237	1.08	24	97,733	105,981	4,072.21	4,415.85
1994	243	1.06	18	66,616	70,454	3,700.89	3,914.11
1995	235	1.09	17	66,352	72,564	3,903.06	4,268.45
1996	237	1.08	7	31,675	34,348	4,525.00	4,906.86
1997	225	1.14	10	44,108	50,381	4,410.80	5,038.11
1998	228	1.13	10	38,754	43,683	3,875.40	4,368.32
1999	228	1.13	11	49,775	56,106	4,525.00	5,100.55
2000	231	1.11	25	113,125	125,858	4,525.00	5,034.31
2001	238	1.08	6	27,150	29,317	4,525.00	4,886.24
2002	250	1.03	10	45,250	46,517	4,525.00	4,651.70
2003	257	1.00	9	40,725	40,725	4,525.00	4,525.00
			****		****		
TOTAL	FOR 19	YEARS	342	1,380,561	1,546,012	4,036.73	4,520.50

#### HECO COST ANALYSIS FOR 250 KVA OVERHEAD 1 PHASE TRANSF

	H-W COS	T INDEX	INSTA	LLED	REPLACEMENT	UNIT	COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED	REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
1985	218	1.18	3	13,946	16,441	4,648.67	5,480.31
1986	220	1.17	0	0	0		•
1987	216	1.19	6	21,306	25,350	3,551.00	4,225.03
1988	216	1.19	3	15,497	18,439	5,165.67	6,146.19
1989	226	1.14	. •		•		*
1990	231	1.11	3	11,503	12,798	3,834.33	4,265.90
1991	231	1.11	3	13,834	15,391	4,611.33	5,130.36
1992	236	1.09	•	•	•		
1993	237	1.08	11	53,601	58,124	4,872.82	5,284.03
1994	243	1.06		•	•		•
1995	235	1.09	•	•	•		•
1996	237	1.08	•	•	•		•
1997	225	1.14	3	13,232	15,114	4,410.67	5,037.96
1998	228	1.13	4	15,502	17,474	3,875.50	4,368.44
1999	228	1.13	6	27,150	30,603	4,525.00	5,100.55
2000	231	1.11	•	•	•	•	
2001	238	1.08	•		•		<b>A</b>
2002	250	1.03	4	18,100	18,607	4,525.00	4,651.70
2003	257	1.00	6	27,150	27,150	4,525.00	4,525.00
TOTAL	FOR 19	YEARS	52	230,821	255,490	4,438.87	4,913.28

#### HECO COST ANALYSIS FOR 333 KVA OVERHEAD 1 PHASE TRANSF

Beregerateredensis

	H-W COS	T INDEX	INSTA	LLED	REPLACEMENT	UNIT	COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED	REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
1985	218	1.18	3	12,788	15,076	4,262.67	5,025.25
1986	220	1.17	5	14,706	17,179	2,941.20	3,435.86
1987	216	1.19	10	56,844	67,634	5,684.40	6,763.38
1988	216	1.19	3	18,030	21,452	6,010.00	7,150.79
1989	226	1.14	5	32,890	37,401	6,578.00	7,480.29
1990	231	1.11	9	48,711	54,194	5,412.33	6,021.51
1991	231	1.11	8	46,144	51,338	5,768.00	6,417.21
1992	236	1.09	12	70,712	77,004	5,892.67	6,417.01
1993	237	1.08	2	12,446	13,496	6,223.00	6,748.15
1994	243	1.06	7	42,679	45,138	6,097.00	6,448.27
1995	235	1.09	•.	•	*	•	•
1996	237	1.08	11	66,075	71,651	6,006.82	6,513.72
1997	225	1.14	•	•	•	•	•
1998	228	1.13	15	77,170	86,985	5,144.67	5,799.03
1999	228	1.13	9	54,063	60,939	6,007.00	6,771.05
2000	231	1.11	•	•	•	•	•
2001	238	1.08	14	84,098	90,812	6,007.00	6,486.55
2002	250	1.03	3	18,021	18,526	6,007.00	6,175.20
2003	257	1.00	5	30,035	30,035	6,007.00	6,007.00
TOTAL	FOR 19	YEARS	121	685,412	758,861	5,664.56	6,271.57

OVERALL TOTAL 17,223 39,031,375 43,340,562

2,266.24 2,516.44

# HECO: SUMMARY OF 1-PHASE OVERHEAD DISTRIB. TRANSFORMERS DATA PERIOD = 1985 - 2003

	INS	TALLED	REPLACEMENT	AVE	COSTS
SIZE	QUANTIT	Y COST	COST	INSTALLED	REPLACED
(KVA)	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
25.0	8,125	15,720,492	17,492,565	1,934.83	2,152.93
37.5	3,311	7,404,559	8,202,564	2,236.35	2,477.37
50.0	3,998	9,785,955	10,848,875	2,447.71	2,713.58
75.0	929	2,692,298	2,977,927	2,898.06	3,205.52
		, <u>, , , , , , , , , , , , , , , , , , </u>	· Dec sec	<u>a 326 ve</u>	_3 647 15

167.0	342	1,380,561	1,546,012	4,036.73	4,520.50
250.0	52	230,821	255,490	4,438.87	4,913.28
333.0	121	685,412	758,861	5,664.56	6,271.57
TOTALS AND AVERAGES	17.223	39.031.375	43,340,562	2,266.24	2,516.44

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### HECO OVERHEAD, 1-PHASE DISTRIBUTION TRANSFORMERS AVERAGE REPLACEMENT COST VS KVA CAPACITY

### The GLM Procedure

				DO	OCKET NO 04-01 PAGE 14 OF	
_	HECO OVE	ERHEAD, 1-PH RAGE REPLACE	ASE DISTRIBU MENT COST VS	TION TRANSFORMER KVA CAPACITY	s	
ì		The	GLM Procedu	re		
ependent Variable:	TOTRUC					
Source		DF	Sum of Squares	Mean Square	F Value	Pr > F
Model		1 1	3457404.61	13457404.61	202.85	<.0001
Error		6	398057.62	66342.94		
Corrected To	tal	7 1	3855462.23			
	R-Square	Coeff V	ar Root	MSE TOTRUC	lean	
	0.971271	6.8910	99 257	.5712 3737	.738	
Source		DF	Type I SS	Mean Square	F Value	Pr > F
SIZE		1	13457404.61	13457404.61	202.85	<.0001
Source		DF	Type III SS	Mean Square	F Value	Pr > F
SIZE		1	13457404.61	13457404.61	202.85	<.0001
			_	ndard	Pr > [t]	
Pa	arameter	Estimate	, i	Error t Value	11 - [4]	
	ntercept IZE	2123.713087 12.445492		05047 14.61 38337 14.24	<.0001 <.0001	

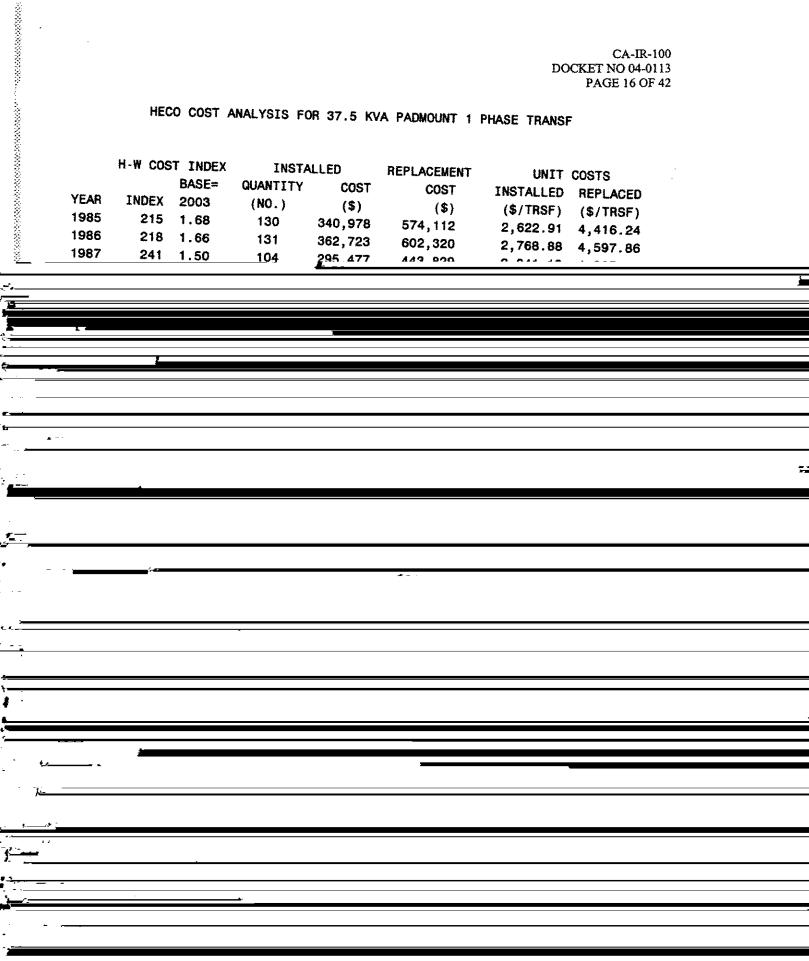
## HECO COST ANALYSIS FOR 25 KVA PADMOUNT 1 PHASE TRANSF

Winderstand &

	H-W COS	ST INDEX	INST	TALLED	REPLACEMENT	UNIT	COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED	REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
1985	215	1.68	59	148,007	249,202	2,508.59	4,223.77
1986	218	1.66	120	340,485	565,393	2,837.38	4,711.60
1987	241	1.50	88	218,561	328,295	2,483.65	3,730.62
1988	268	1.35	127	359,435	485,505	2,830.20	3,822.88
1989	284	1.27	121	424,621	541,242	3,509.26	4,473.08
1990	285	1.27	33	68,478	86,979	2,075.09	2,635.73
1991	299	1.21	87	302,332	366,034	3,475.08	4,207.29
1992	296	1.22	120	419,842	513,455	3,498.68	4,278.80
1993	306	1.18	113	397,157	469,839	3,514.66	4,157.87
1994	308	1.18	185	577,911	679,233	3,123.84	3,671.53
1995	310	1.17	179	645,420	753,684	3,605.70	4,210.53
1996	323	1.12	136	528,181	591,955	3,883.68	4,352.61
1997	325	1.11	66	256,344	285,528	3,884.00	4,326.18
1998	327	1.11	86	277,226	306,899	3,223.56	3,568.59
1999	329	1.10	79	306,836	337,613	3,884.00	4,273.58
2000	332	1.09	104	403,936	440,436	3,884.00	4,234.96
2001	351	1.03	42	163,128	168,240	3,884.00	4,005.72
2002	365	0.99	31	120,404	119,414	3,884.00	3,852.08
2003	362	1.00	42	163,128	163,128	3,884.00	3,884,00
		****					
IOTAL	FOR 19	YEARS	1818	6,121,432	7,452,076	3,367.12	4,099.05

# HECO COST ANALYSIS FOR 37.5 KVA PADMOUNT 1 PHASE TRANSF

	H-W COS	T INDEX	INSTALLED		REPLACEMENT	UNIT COSTS		
		BASE=	QUANTITY	COST	COST	INSTALLED	REPLACED	
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF)		
1985	215	1.68	130	340,978	574,112	2,622.91	(\$/TRSF)	
1986	218	1.66	131	362,723	602,320	-	4,416.24	
1987	241	1.50	104	295 477	443 920	2,768.88	4,597.86	



# HECO COST ANALYSIS FOR 50 KVA PADMOUNT 1 PHASE TRANSF

	H-W COST INDEX		INSTALLED		REPLACEMENT UNIT COST		COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED	REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
1985	215	1.68	107	351,685	592,139	3,286.78	5,534.01
1986	218	1.66	169	522,362	867,408	3,090.90	
1987	241	1.50	132	386,776	580,966	2,930.12	5,132.59
1988	268	1.35	98	308,141	416,220	3,144.30	4,401.26
1989	284	1.27	120	445,645	568,040	3,713.71	4,247.15
1990	285	1.27	87	221,240	281,014	=	4,733.67
1991	299	1.21	70	341,668	413,658	2,542.99	3,230.04
1992	296	1.22	141	539, 183	659,406	4,880.97	5,909.40
1993	306	1.18	157	628,543	743,570	3,823.99	4,676.64
1994	308	1.18	131	483,058	567,750	4,003.46	4,736.12
1995		1.17	179	749,742	•	3,687.47	4,333.97
1996		1.12	122	<del>-</del>	875,505	4,188.50	4,891.09
1997		1.11	71	514,043	576,110	4,213.47	4,722.21
1998		1.11		299,123	333,177	4,213.00	4,692.63
1999			166	580,438	642,564	3,496.61	3,870.87
		1.10	183	770,979	848,311	4,213.00	4,635.58
2000		1.09	77	324,401	353,714	4,213.00	4,593.69
2001	351	1.03	149	627,737	647,410	4,213.00	4,345.03
_^^^						*	

# HECO COST ANALYSIS FOR 75 KVA PADMOUNT 1 PHASE TRANSF

HASE = QUANTITY COST COST INSTALLED REPLACEMENT UNIT COSTS  YEAR INDEX 2003 (NO.) (\$) (\$) (\$/TRSF) (\$/TRSF)  1985 215 1.68 6 20,913 35,212 3,485.50 5,868.  1986 218 1.66 57 165,385 274,630 2,901.49 4,818.  1987 241 1.50 29 82,430 123,816 2,842.41 4,269.  1988 268 1.35 1 4,032 5,446 4,032.00 5.446.	
YEAR     INDEX     2003     (NO.)     (\$)     (\$)     (\$/TRSF)     (\$/TRSF)       1985     215     1.68     6     20,913     35,212     3,485.50     5,868.       1986     218     1.66     57     165,385     274,630     2,901.49     4,818.       1987     241     1.50     29     82,430     123,816     2,842.41     4,269.       1988     268     1.35     1     4,269     7,110	FN
1985     215     1.68     6     20,913     35,212     3,485.50     5,868.       1986     218     1.66     57     165,385     274,630     2,901.49     4,818.       1987     241     1.50     29     82,430     123,816     2,842.41     4,269.       1988     268     1.35     1     4,269.	
1986 218 1.66 57 165,385 274,630 2,901.49 4,818. 1987 241 1.50 29 82,430 123,816 2,842.41 4,269.	•
1987 241 1.50 29 82,430 123,816 2,842.41 4,269.	
1988 268 1 35 1 4 4 200	
7,000 3.440 4.032 00 K AAR	
1989 284 1.27 16 66,711 85,033 4,169.44 5,314.	
1990 285 1.27 11 31,418 39,906 2,856.18 3,627	
1991 299 1.21 23 94,754 114,719 4,119.74 4,987.	
1992 296 1.22 21 79,253 96,924 3,773.95 4,615.4	
1993 306 1 18 40 451 007	
1994 308 1 18 35 114 000 101 000	
1995 310 1 17 10 07 740	
1996 323 1.12 27 129_054 144 626 4.616.42 5,390.1	/ ¥

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#### HECO COST ANALYSIS FOR 100 KVA PADMOUNT 1 PHASE TRANSF

	H-W COST INDEX		INSTALLED		REPLACEMENT UNIT COSTS		COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED	REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
1985	215	1.68	9	31,907	53,722	3,545.22	5,969.16
1986	218	1.66	21	76,066	126,311	3,622.19	6,014.83
1987	241	1.50	10	33,375	50,132	3,337.50	5,013.17
1988	268	1.35	*	•	•		•
1989	284	1.27	4	19,090	24,333	4,772.50	6,083.26
1990	285	1.27	9	27,769	35,272	3,085.44	3,919.06
1991	299	1.21	4	17,863	21,627	4,465.75	5,406.69
1992	296	1.22	7	27,558	33,703	3,936.86	4,814.67
1993	306	1.18	9	37,742	44,649	4,193.56	4,961.00
1994	308	1.18	9	39,722	46,686	4,413.56	5,187.36
1995	310	1.17	4	19,952	23,299	4,988.00	5,824.70
1996	323	1.12	1	6,391	7,163	6,391.00	7,162.67
1997	325	1.11	5	31,955	35,593	6,391.00	7,118.59
1998	327	1.11	7	37,130	41,104	5,304.29	5,872.02
1999	329	1.10	6	38,346	42,192	6,391.00	7,032.04
2000	332	1.09	2	12,782	13,937	6,391.00	6,968.50
2001	351	1.03	10	63,910	65,913	6,391.00	6,591.29
2002	365	0.99	11	70,301	69,723	6,391.00	6,338.47
2003	362	1.00	12	76,692	76,692	6,391.00	6,391.00
TOTAL	FOR 19	YEARS	140	668,551	812,051	4,775.36	5,800.36

#### HECO COST ANALYSIS FOR 167 KVA PADMOUNT 1 PHASE TRANSF

	H-W COST INDEX		INSTALLED		REPLACEMENT	UNIT	COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED	REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
1985	215	1.68	7	29,237	49,227	4,176.71	7,032.42
1986	218	1.66	4	16,779	27,862	4,194.75	6,965.59
1987	241	1.50	3	6,815	10,237	2,271.67	3,412.21
1988	268	1.35	12	41,067	55,471	3,422.25	4,622.59
1989	284	1.27	•	•	•		•
1990	285	1.27	6	27,293	34,667	4,548.83	5,777.82
1991	299	1.21	1	5,795	7,016	5,795.00	7,016.02
1992	296	1.22	1	4,817	5,891	4,817.00	5,891.06
1993	306	1.18	3	16,400	19,401	5,466.67	6,467.10
1994	308	1.18	2	10,047	11,808	5,023.50	5,904.24
1995	310	1.17	1	6,495	7,584	6,495.00	7,584.48
1996	323	1.12	4	29,622	33,199	7,405.50	8,299.66
1997	325	1.11	•	•	•	-	•
1998	327	1.11	1	6,146	6,804	6,146.00	6,803.83
1999	329	1.10	2	14,810	16,296	7,405.00	8,147.75
2000	332	1.09	1	7,405	8,074	7,405.00	8,074.13
2001	351	1.03	1	7,405	7,637	7,405.00	7,637.07
2002	365	0.99	3	22,215	22,032	7,405.00	7,344.14
TOTAL	FOR 18	YEARS	52	252,348	323,207	4,852.85	6,215.52

OVERALL TOTAL

8,096 29,661,754 35,558,423 3,663.75 4,392.10

# HECO: SUMMARY OF 1-PHASE PADMOUNT DISTRIB. TRANSFORMERS DATA PERIOD = 1985 - 2003

	INSTALLED		REPLACEMENT	AVE COSTS	
SIZE	QUANTIT	ry cost	COST	INSTALLED	REPLACED
(KVA)	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
25.0	1,818	6,121,432	7,452,076	3,367.12	4,099.05
37.5	3,023	10,791,327	12,929,188	3,569.74	4,276.94
50.0	2,577	9,855,798	11,722,425	3,824.52	4,548.86
75.0	486	1,972,298	2,319,477	4,058.23	4,772.59
100.0	140	668,551	812,051	4,775.36	5,800.36
167.0	52	252,348	323,207	4,852.85	6,215.52
~~~~~~				****	
TOTALS AND AVERAGES	8,096	29,661,754	35,558,423	3,663.75	4,392.10

CUSTOMER COMPONENT, MIN. SIZE METHOD (%) = 91.90 93.33

### HECO PADMOUNT, 1-PHASE DISTRIBUTION TRANSFORMERS AVERAGE REPLACEMENT COST VS KVA CAPACITY

#### The GLM Procedure

0						
Dependent Variat Source Model Error Corrected				DO	CA-IR-1 OCKET NO 04-01 PAGE 22 OF	.13
_	HECO PA	DMOUNT, 1-PHA RAGE REPLACEN	SE DISTRIBU IENT COST VS	TION TRANSFORMER	as	
		The G	LM Procedur	e		
Dependent Variat	ole: TOTRUC					
Source		DF	Sum of Squares	Mean Square	F Value	Pr > F
Model		1 34	10247.130	3410247.130	48.05	0.0023
Error		4 2	83883.076	70970.769		
Corrected	Total	5 36	94130.206			
	R-Square	Coeff Va	r Root	MSE TOTRUC N	lean	
	0.923153	5.37947	'4 266.	4034 4952.	221	
Source		DF	Type I SS	Mean Square	F Value	Pr > F
SIZE		1 34	110247.130	3410247.130	48.05	0.0023
Source		DF T	ype III SS	Mean Square	F Value	Pr > F
SIZE		1 3	410247.130	3410247.130	48.05	0.0023
	Parameter	Estimate	Stand E	dard rror t Value	Pr >  t	
	Intercept SIZE	3753.447865 15.825382	204.291 2.282		<.0001 0.0023	

# HECO COST ANALYSIS FOR 25 KVA PADMOUNT 3 PHASE TRANSF

કરિજમિક્ષ્યણ ત્યોપેલ્ટરણ ત્યા ભેલ્થ છી કરામાં પ્રાથમિક પ્રથમિક હોક તો ઉપલબ્ધ ઉપલબ્ધ છે. તે કરામાં ભાગ તે હોંગ ત

	H-W COS	TINDEX	INSTA	LLED	REPLACEMENT	UNIT	
	** ** ** *	BASE=	QUANTITY	COST	COST	INSTALLED	REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
1994	308	1.18	27	110,036	129,328	4,075.41	4,789.93
1995	310	1.17	3	30,637	35,776	10,212.33	
1996	323	1.12	1	7,141	8,003	7,141.00	8,003.23
1997	325	1.11	•		•	•	•
1998	327	1.11	•		•	•	*
1999	329	1.10			•	•	•
2000	332	1.09		•			7,364.79
2001	351	1.03	1	7,141	7,365	7,141.00	7,304.79
2002	365	0.99	•	•	•	•	•
2003	362	1.00			•	•	
				454 REE	180 472	4.842.34	5.63 <u>9.75</u>

## HECO COST ANALYSIS FOR 37.5 KVA PADMOUNT 3 PHASE TRANSF

	H-W COST INDEX		INSTALLED		REPLACEMENT	UNIT	COSTS
	••••	BASE=	QUANTITY	COST	COST	INSTALLED	REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
1987	241	1.50	26	85,003	127,681	3,269.35	4,910.80
1988	268	1.35				•	•
1989	284	1.27	•	•	•	•	•
1990	285	1.27			•	•	•
1991	299	1.21	2	8,003	9,689	4,001.50	4,844.63
1992	296	1.22	•	•		•	•
1993	306	1.18	•		•	*	•
1994	308	1.18	30	122,061	143,461	4,068.70	4,782.04
1995	310	1.17	•		•	*	•
1996	323	1.12	15	66,606	74,648	4,440.40	4,976.55
1997	325	1.11			•	*	•
1998	327	1.11	1	3,663	4,055	3,663.00	4,055.06
1999	329	1.10	•		•	•	•
2000	332	1.09	4	•	•	•	•
2001	351	1.03	•		•	•	•
2002	365	0.99	•	•	•	•	•
2003	362	1.00	•	•	•		•
		****					
TOTA	L FOR 17	YEARS	74	285,336	359,535	3,855.89	4,858.58

## HECO COST ANALYSIS FOR 50 KVA PADMOUNT 3 PHASE TRANSF

SERVICE SERVICE SERVICES

	H-W COST INDEX		INSTALLED		REPLACEMENT	UNIT	COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED	REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
1985	215	1.68	10	32,158	54,145	3,215.80	5,414.51
1986	218	1.66	•		•	•	•
1987	241	1.50	20	62,134	93,330	3,106.70	4,666.50
1988	268	1.35	•		•	•	•
1989	284	1.27	•		•	•	•
1990	285	1.27	•	•	•	•	•
1991	299	1.21	•	•	•	*	•
1992	296	1.22	•	•	•	•	•
1993	306	1.18	•		•		
1994	308	1.18	44	193,772	227,745	4,403.91	5,176.02
1995	310	1.17	•	•	•		
1996	323	1.12	5	23,207	26,009	4,641.40	5,201.82
1997	325	1.11	•	•	•	•	•
1998	327	1.11	•	•	•	•	•
1999	329	1.10	•	•	•	•	•
2000	332	1.09	•	•	•	•	•
2001	351	1.03	*	•	•	•	•
2002	365	0.99	•	•	*	•	•
2003	362	1.00	•	•	•	•	•
TOTAL	FOR 19	YEARS	79	311,271	401,229	3,940.14	5,078.85

# HECO COST ANALYSIS FOR 75 KVA PADMOUNT 3 PHASE TRANSF

	H-W COST INDEX		INSTALLED		REPLACEMENT	UNIT COSTS
	., ., .,	BASE=	QUANTITY	COST	COST	INSTALLED REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF) (\$/TRSF)
1985	215	1.68	17	142,061	239,191	8,356.53 14,070.06
1986	218	1.66	12	95,804	159,087	7,983.67 13,257.28
1987	241	1.50	9	62,403	93,734	6,933.67 10,414.89
1988	268	1.35	10	87,674	118,425	8,767.40 11,842.53
1989	284	1.27	16	135,736	173,016	8,483.50 10,813.48
1990	285	1.27	17	172,387	218,962	10,140.41 12,880.10
1991	299	1.21	30	272,759	330,230	9,091.97 11,007.67
1992	296	1.22	30	266,173	325,522	8,872.43 10,850.75
1993	306	1.18	27	237,286	280,711	8,788.37 10,396.70
1994	308	1.18	35	279,238	328,195	7,978.23 9,377.01
1995	310	1.17	19	142,341	166,218	7,491.63 8,748.29
1996	323	1.12	34	312,472	350,201	9,190.35 10,300.02
1997	325	1.11	19	174,610	194,489	9,190.00 10,236.25
1998	327	1.11	34	257,780	285,371	7,581.76 8,393.27
1999	329	1.10	24	220,560	242,683	9,190.00 10,111.79
2000	332	1.09	35	321,650	350,715	9,190.00 10,020.42
2001	351	1.03	23	211,370	217,994	9,190.00 9,478.01
2002	365	0.99	10	91,900	91,145	9,190.00 9,114.47
2003	362	1.00	19	174,610	174,610	9,190.00 9,190.00
						0 744 46 40 224 52
TOTAL	FOR 19	YEARS	420	3,658,814	4,340,498	8,711.46 10,334.52

### HECO COST ANALYSIS FOR 112 KVA PADMOUNT 3 PHASE TRANSF

	H-W COST INDEX		INSTALLED		REPLACEMENT	UNIT COSTS	
		BASE=	QUANTITY	COST	COST	INSTALLED REPLAC	
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF) (\$/TRS	
1985	215	1.68	7	50,830	85,584	7,261.43 12,226.	
1986	218	1.66	9	64,966	107,879	7,218.44 11,986.	
1987	241	1.50	8	62,212	93,447	7,776.50 11,680.	
1988	268	1.35	7	61,426	82,971	8,775.14 11,852.	
1989	284	1.27	13	164,847	210,122	12,680.54 16,163.	
1990	285	1.27	17	138,566	176,003	8,150.94 10,353	
1991	299	1.21	17	164,323	198,946	9,666.06 11,702.	
1992	296	1.22	7	61,735	75,500	8,819.29 10,785	
1993	306	1.18	10	85,938	101,665	8,593.80 10,166	
1994	308	1.18	13	120,495	141,621	9,268.85 10,893	
1995	310	1.17	2	18,933	22,109	9,466.50 11,054	
1996	323	1.12	1	11,021	12,352	11,021.00 12,351	.71
1997	325	1.11	•	•	•		, 4 P
1998	327	1.11	1	9,092	10,065	9,092.00 10,065	. 15
1999	329	1.10	•	•	•	•	•
2000	332	1.09	•	•	•	•	•
2001	351	1.03	•	•	•	•	•
2002	365	0.99	•	•	•	<b>a</b>	•
2003	362	1.00	•	•	•	•	
TOTAL	FOR 19	YEARS	112	1,014,384	1,318,264	9,057.00 11,770	.21

### HECO COST ANALYSIS FOR 150 KVA PADMOUNT 3 PHASE TRANSF

	H-W COST INDEX		INSTALLED		REPLACEMENT	UNIT COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF) (\$/TRSF)
1985	215	1.68	15	132,976	223,894	8,865.07 14,926.30
1986	218	1.66	8	83,282	138,294	10,410.25 17,286.75
1987	241	1.50	15	120,340	180,760	8,022.67 12,050.64
1000	nen_	1 2E .	1.6	150 457	203 229	9.403.56 12.701.83

stible content and the content of th

1989	284	1.27	29	237,775	303,079	8,199.14 10,451.01
1990	285	1.27	27	223,223	283,532	8,267.52 10,501.20
1991	299	1.21	19	196,446	237,838	10,339.26 12,517.77
1992	296	1.22	23	221,804	271,260	9,643.65 11,793.93
1993	306	1.18	21	203,415	240,641	9,686.43 11,459.11
1994	308	1.18	11	129,659	152,391	11,787.18 13,853.77
1995	310	1.17	20	199,519	232,987	9,975.95 11,649.34
1996	323	1.12	36	378,161	423,821	10,504.47 11,772.81
1997	325	1.11	16	168,064	187,197	10,504.00 11,699.84
1998	327	1.11	41	355,299	393,328	8,665.83 9,593.36
1999	329	1.10	33	346,632	381,401	10,504.00 11,557.59
2000	332	1.09	77	808,808	881,893	10,504.00 11,453.16
2001	351	1.03	34	357,136	368,328	10,504.00 10,833.19
2002	365	0.99	12	126,048	125,012	10,504.00 10,417.67
2003	362	1.00	32	336,128	336,128	10,504.00 10,504.00
TOTAL	FOR 19	YEARS	485	4,775,172	5,565,015	9,845.72 11,474.26

### HECO COST ANALYSIS FOR 225 KVA PADMOUNT 3 PHASE TRANSF

	H-W COS	T INDEX	INST	ALLED	REPLACEMENT	UNIT COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF) (\$/TRSF)
1985	215	1.68	10	112,337	189,144	11,233.70 18,914.42
1986	218	1.66	7	69,596	115,568	9,942.29 16,509.67
1987	241	1.50	8	74,758	112,292	9,344.75 14,036.51
1988	268	1.35	20	213,567	288,475	10,678.35 14,423.74
1989	284	1.27	10	112,188	143,000	11,218.80 14,300.02
1990	285	1.27	17	156,291	198,517	9,193.59 11,677.47
1991	299	1.21	17	187,676	227,220	11,039.76 13,365.87
1992	296	1.22	15	160,056	195,744	10,670.40 13,049.61
1993	306	1.18	17	181,983	215,287	10,704.88 12,663.95
1994	308	1.18	16	162,439	190,919	10,152.44 11,932.41
1995	310	1.17	14	145,526	169,937	10,394.71 12,138.34
1996	323	1.12	27	293,451	328,883	10,868.56 12,180.86
1997	325	1.11	6	65,214	72,638	10,869.00 12,106.39
1998	327	1.11	23	206,240	228,315	8,966.96 9,926.72
1999	329	1.10	15	163,035	179,388	10,869.00 11,959.20
2000	332	1.09	21	228,249	248,874	10,869.00 11,851.14
2001	351	1.03	26	282,5 <del>9</del> 4	291,450	10,869.00 11,209.62
2002	365	0.99	8	86,952	86,237	10,869.00 10,779.67
2003	362	1.00	9	97,821	97,821	10,869.00 10,869.00
TOTAL	L FOR 19	YEARS	286	2,999,973	3,579,709	10,489.42 12,516.47

### HECO COST ANALYSIS FOR 300 KVA PADMOUNT 3 PHASE TRANSF

	H-W COS	TINDEX	INSTA	ALLED	REPLACEMENT	UNIT COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF) (\$/TRSF)
1985	215	1.68	4	42,342	71,292	10,585.50 17,823.03
1986	218	1.66	11	123,040	204,314	11,185.45 18,574.01
1987	241	1.50	9	102,025	153,249	11,336.11 17,027.69
1988	268	1.35	13	157,496	212,737	12,115.08 16,364.39
1989	284	1.27	17	196,878	250,950	11,581.06 14,761.77
1990	285	1.27	16	174,266	221,348	10,891.63 13,834.27
1991	299	1.21	25	304,074	368,143	12,162.96 14,725.72
1992	296	1.22	15	169,118	206,827	11,274.53 13,788.45
1993	306	1.18	23	272,624	322,516	11,853.22 14,022.43
1994	308	1.18	23	270,546	317,979	11,762.87 13,825.19
1995	310	1.17	17	213,865	249,739	12,580.29 14,690.54
1996	323	1.12	20	263,562	<b>295,385</b>	13,178.10 14,769.26
1997	325	1.11	12	158,136	176,139	13,178.00 14,678.26
1998	327	1.11	20	217,438	240,711	10,871.90 12,035.56
1999	329	1.10	15	197,670	217,497	13,178.00 14,499.81
2000	332	1.09	32	421,696	459,801	13,178.00 14,368.78
2001	351	1.03	32	421,696	434,912	13,178.00 13,590.99
2002	365	0.99	14	184,492	182,976	13,178.00 13,069.69
2003	362	1.00	42	553,476	553,476	13,178.00 13,178.00
			****		******	
TOTAL	FOR 19	YEARS	360	4,444,440	5,139,992	12,345.67 14,277.76

### HECO COST ANALYSIS FOR 500 KVA PADMOUNT 3 PHASE TRANSF

	H-W COS	T INDEX	INSTA	LLED	REPLACEMENT	UNIT COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF) (\$/TRSF)
1985	215	1.68	8	112,539	189,484	14,067.38 23,685.53
1986	218	1.66	15	216,225	359,053	14,415.00 23,936.83
1987	241	1.50	20	225,033	338,016	11,251.65 16,900.82
1988	268	1.35	16	207,106	279,748	12,944.13 17,484.23
1989	284	1.27	20	315,018	401,537	15,750.90 20,076.85
1990	285	1.27	24	374,900	476,189	15,620.83 19,841.20
1991	299	1.21	28	420,863	509,540	15,030.82 18,197.85
1992	296	1.22	19	279,001	341,211	14,684.26 17,958.46
1993	306	1.18	32	344,406	407,435	10,762.69 12,732.33
1994	308	1.18	23	323,129	379,781	14,049.09 16,512.24
1995	310	1.17	11	159,361	186,093	14,487.36 16,917.50
1996	323	1.12	16	251,180	281,508	15,698.75 17,594.26
1997	325	1.11	11	172,689	192,349	15,699.00 17,486.27
1998	327	1.11	24	310,841	344,111	12,951.71 14,337.98
1999	329	1.10	16	251,184	276,379	15,699.00 17,273.67
2000	332	1.09	16	251,184	273,881	15,699.00 17,117.58
2001	351	1.03	33	518,067	534,303	15,699.00 16,190.99
2002	365	0.99	12	188,388	186,840	15,699.00 15,569.97
2003	362	1.00	31	486,669	486,669	15,699.00 15,699.00
TOTAL	FOR 19	YEARS	375	5,407,783	6,444,126	14,420.75 17,184.34

#### HECO COST ANALYSIS FOR 750 KVA PADMOUNT 3 PHASE TRANSF

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8	1985	215 1.0		4 76,356		19,089.00 32,140.55	
	1986 1987	218 1.6 241 1.6		3 53,841 1 180,651	89,406 271,351	17,947.00 29,801.90 16,422.82 24,668.30	
	1988	268 1.				18,604.30 25,129.69	

### HECO COST ANALYSIS FOR 1000 KVA PADMOUNT 3 PHASE TRANSF

	H-W COS	T INDEX	INSTA	ALLED	REPLACEMENT	UNIT COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF) (\$/TRSF)
1986	218	1.66	3	52,000	86,349	17,333.33 28,782.87
1987	241	1.50	2	35,458	53,261	17,729.00 26,630.28
1988	268	1.35	14	236,800	319,857	16,914.29 22,846.91
1989	284	1.27	12	194,163	247,489	16,180.25 20,624.12
1990	285	1.27	6	96,355	122,388	16,059.17 20,397.96
1991	299	1.21	2	38,643	46,785	19,321.50 23,392.59
1992	296	1.22	6	117,301	143,456	19,550.17 23,909.33
1993	306	1.18	11	190,668	225,561	17,333.45 20,505.59
1994	308	1.18	4	77,139	90,663	19,284.75 22,665.84
1995	310	1.17	3	61,898	72,281	20,632.67 24,093.63
1996	323	1.12	6	122,754	137,576	20,459.00 22,929.28
1997	325	1.11	1	20,459	22,788	20,459.00 22,788.18
1998	327	1.11	4	67,515	74,741	16,878.75 18,685.34
1999	329	1.10	8	163,672	180,089	20,459.00 22,511.12
2000	332	1.09	5	102,295	111,539	20,459.00 22,307.70
2001	351	1.03	5	102,295	105,501	20,459.00 21,100.17
2002	365	0.99	2	40,918	40,582	20,459.00 20,290.84
2003	362	1.00	8	163,672	163,672	20,459.00 20,459.00
TOTAL	FOR 18	YEARS	102	1,884,005	2,244,577	18,470.64 22,005.66

### HECO COST ANALYSIS FOR 1500 KVA PADMOUNT 3 PHASE TRANSF

	H-W COS	T INDEX	INST	ALLED	REPLACEMENT	UNIT COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF) (\$/TRSF)
1986	218	1.66	5	87,994	146,118	17,598.80 29,223.70
1987	241	1.50	1	20,952	31,471	20,952.00 31,471.47
1988	268	1.35	5	118,970	160,698	23,794.00 32,139.66
1989	284	1.27		•	•	•
1990	285	1.27	3	55,953	71,070	18,651.00 23,690.04
1991	299	1.21	14	296,945	359,512	21,210.36 25,679.43
1992	296	1.22	6	125,635	153,648	20,939.17 25,608.03
1993	306	1.18	7	147,394	174,368	21,056.29 24,909.72
1994	308	1.18	11	215,785	253,617	19,616.82 23,056.13
1995	310	1.17	1	24,074	28,112	24,074.00 28,112.22
1996	323	1.12	6	134,670	150,930	22,445.00 25,155.08
1997	325	1.11	4	89,780	100,001	22,445.00 25,000.28
1998	327	1.11	7	129,620	143,494	18,517.14 20,499.10
1999	329	1.10	•	•	•	• • • • • • • • • • • • • • • • • • • •
2000	332	1.09	3	67,335	73,419	22,445.00 24,473.16
2001	351	1.03	7	157,115	162,039	22,445.00 23,148.40
2002	365	0.99	6	134,670	133,563	22,445.00 22,260.52
2003	362	1.00	14	314,230	314,230	22,445.00 22,445.00
TOTAL	FOR 18	YEARS	100	2,121,122	2,456,293	21,211.22 24,562.93

# HECO COST ANALYSIS FOR 2000 KVA PADMOUNT 3 PHASE TRANSF

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	H-W COS	TINDEX	INST	ALLED	REPLACEMENT	UNIT (	COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED	REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
1991	299	1.21	1	30,117	36,463	30,117.00	
1992	296	1.22	3	109,111	133,440	36,370.33	
1993	306	1.18	2	52,003	61,520	26,001.50	-
1994	308	1.18	1	35,427	41,638	35,427.00	41,638.23
1995	310	1.17	•	•	•	•	•
1996	323	1.12	1	26,248	29,417	26,248.00	
1997	325	1.11	3	78,744	87,709	26,248.00	29,236.23
1998	327	1.11	•	-	•	•	•
1999	329	1.10		•	•	•	•
2000	332	1.09	1	26,248	28,620	26,248.00	
2001	351	1.03	1	26,248	27,071	26,248.00	
2002	365	0.99	2	52,496	52,065	26,248.00	
2003	362	1.00	6	157,488	157,488	26,248.00	26,248.00
TOTAL	FOR 13	YEARS	21	594,130	655,430	28,291.90	31,210.93

# HECO COST ANALYSIS FOR 2500 KVA PADMOUNT 3 PHASE TRANSF

	H-W COS	TINDEX	INSTA	LLED	REPLACEMENT	UNIT	COSTS
		BASE=	QUANTITY	COST	COST	INSTALLED	REPLACED
YEAR	INDEX	2003	(NO.)	(\$)	(\$)	(\$/TRSF)	(\$/TRSF)
1991	299	1.21	` a´	90,067	109,044	30,022.33	
1992	296	1.22	1	44,026	53,843	44,026.00	
1993	306	1.18	1	30,261	35,799	30,261.00	35,798.96
1994	308	1.18	•		•	•	•
1995	310	1.17				•	•
1996	323	1.12	7	191,418	214,530	27,345.43	30,647.20
1997	325	1.11	•	•	•		•
1998	327	1.11	•	•	•	•	•
1999	329	1.10	•	•	•	•	•
2000	332	1.09	•	•	•	•	
2001	351	1.03	9	246,105	253,818	-	28,201.97
2002	365	0.99	2	54,690	54,240	27,345.00	27,120.25
							04 050 70
TOTAL	FOR 12	YEARS	23	656,567	721,274	28,546.39	31,359.76

OVERALL TOTAL

2,647 31,827,274 37,558,241

12,023.90 14,188.98

HECO: SUMMARY OF 3-PHASE PADMOUNT DISTRIB. TRANSFORMERS
DATA PERIOD = 1970 - 2003

	INST	ALLED	REPLACEMENT	AVE COSTS
SIZE	QUANTITY		COST	INSTALLED REPLACED
(KVA)	(NO.)	(\$)	(\$)	(\$/TRSF) (\$/TRSF)
(847)	()	( )		•
25.0	32	154,955	180,472	4,842.34 5,639.75
23.0	<b>U</b> L	10.,000	,	•
37.5	74	285,336	359,535	3,855.89 4,858.58
37.3	, ,	,	•	•
50.0	79	311,271	401,229	3,940.14 5,078.85
30.0	. •	• , =	•	•
75.0	420	3,658,814	4.340,498	8,711.46 10,334.52
75.0		•,,-		
112.0	112	1,014,384	1,318,264	9,057.00 11,770.21
1,2.0		, ,		
150.0	485	4,775,172	5,565,015	9,845.72 11,474.26
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225.0	286	2,999,973	3,579,709	10,489.42 12,516.47
300.0	360	4,444,440	5,139,992	12,345.67 14,277.76
500.0	375	5,407,783	6,444,126	14,420.75 17,184.34
750.0	178	3,519,322	4,151,826	19,771.47 23,324.86
1000.0	102	1,884,005	2,244,577	18,470.64 22,005.66
				T. T. O. O. F.C. DO
1500.0	100	2,121,122	2,456,293	21,211.22 24,562.93
2000.0	21	594,130	655,430	28,291.90 31,210.93
				00 546 20 21 250 76
2500.0	23	656,567	721,274	28,546.39 31,359.76
				12,023.90 14,188.98
TOTALS AND AVERAGES	2,647	31,827,274	37,558,241	12,023.30 14,100.30

CUSTOMER COMPONENT, MIN. SIZE METHOD (%) = 40.27 39.75

Win Indicapt (%) = 64 71

### HECO PADMOUNT, 3-PHASE DISTRIBUTION TRANSFORMERS AVERAGE REPLACEMENT COST VS KVA CAPACITY FOR SELECTED SIZES

#### The GLM Procedure

Service of the property of the

	AVERAGE HEPL			TY FOR SELECTED	-	,
		The	e GLM Procedure	<del>!</del>		
dent Varial	ole: TOTRUC					
Source		DF	Sum of Squares	Mean Square	F Value	Pr > F
Model		1	932317437	932317437	82.53	<.0001
Error		12	135552317	11296026		
Corrected	Total	13	1067869755			
	R-Squar	e Coeff	Var Root	MSE TOTRUC M	ean	
	0.87306	3 20.85	5710 <b>336</b> 0.	.956 16114	.21	
Source		DF	Type I SS	Mean Square	F Value	Pr > 1
SIZE		1	932317437.3	932317437.3	82.53	<.000
Source		DF	Type III SS	Mean Square	F Value	Pr >
SIZE		1	932317437.3	932317437.3	82.53	<.000
			Stand	lard	<b>.</b> •	
	Parameter	Estimat	e Er	ror t Value	Pr >  t	
	HECO PANERAGE REPLANCE  Die: TOTRUC  Total  R-Squar  0.87306	9181.04616 10.52243			<.0001 <.0001	

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							F	Plant Cost	Index	08:49	Wednesday,	April 28,	2004
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			0	U	Н	M	G		0	U	H	M	G
			Н	G	T	T	C		Н	G	T	T	C
		P	C	C	F	F	0	P	C	C	F	F	0
,	Υ	I	I	I	I	I	N	I	I	I	I	I	N
- 0	Ε	N	N	N	N	N	D	N	N	N	N	N	a
b	Ā	D	D	D	D	D	U	D	D	D	D	D	U
s	R	1	1	1	1	1	1	2	2	2	2	2	2
1	1970	76	87	86	102	95	81	5.75000	5.18391	4.05814	4 2.51961	3.81053	4.8642
2	1971	82	95	86	101	97	87	5.32927	4.74737	4.05814	4 2.54455	3.73196	4.5287
3	1972	88	98	99	99	99	95	4.96591	4.60204	3.5252	5 2.59596	3.65657	4.1473
4	1973	100	100	100	100	100	100	4.37000	4.51000	3.49000	2.57000	3.62000	3.9400
5	1974	124	114	131	109	103	111	3.52419	3.95614	2.66412	2 2.35780	3.51456	3.5495
6	1975	147	142	128	134	106	127	2.97279	3.17606	2.72656	1.91791	3.41509	3.1023
7	1976	152	167	138	135	107	138	2.87500	2.70060	2.52899	1.90370	3.38318	2.8550
8	1977	163	186	150	149	119	150	2.68098	2.42473	2.32667	7 1.72483	3.04202	2.6266
9	1978	175	177	158	159	134	163	2.49714	2.54802	2.20886	1.61635	2.70149	2.4171
10	1979	199	197	200	171	145	182	2.19598	2.28934	1.74500	1.50292	2.49655	2.1648
11	1980	219	219	222	165	172	198	1.99543	2.05936	1.57207	7 1.55758	2.10465	1.9899
12	1981	241	239	227	201	200	215	1.81328	1.88703	1.53744	1.27861	1.81000	1.8325
13	1982	263	263	234	216	203	232	1.66160	1.71483	1.4914	5 1.18981	1.78325	1.6982
14	1,983	285	278	234	217	204	246	1.64906	1_62230	1.4914	5 1.18433	1.77451	1.6016
<u> </u>	<del>,</del>												

### E-6

Most Arthur Branch (1978)

#### COST TRENDS OF ELECTRIC UTILITY CONSTRUCTION

### PACIFIC REGION (1973=100)

•				COST INDEX NUMBERS													
		Į		1985		1986		1987		1988		1989		1990		1991	
)	L-ne	CONSTRUCTION AND EQUIPMENT	FERC	jacı,	- - Jul. 1	Jane. 1	Jul. i	Jan. 1	Jud. l	Jan. 1	Jul. 1	Jan. 1	J립. 1	Jan. I	Jul. ì	Jan. 1	Jul. 1
	1 2 3	Total Plant-All Steam Generation Total Plant-All Steam & Nuclear Gen. Total Plant-All Steam & Hydro Gen.		258 258 254	258 258 254	260 260 256	260 260 257	259 259 256	262 262 259	271 270 266	282 282 277	288 288 283	293 293 288	297 297 292	302 302 297	302	
<b>.</b> '	4 5 6 7 8 9	Steam Production Plant Total Steam Production Plant Structures & Improvements-Indoor Structures & Improvements-Semi-Outdoor Boiler Plant Equipment-Coal Fired Boiler Plant Equipment-Gas Fired	311 311 312 312	269 249 249 274 274	268 248 242 276 	269 250 246 277 -	270 253 251 280 -	272 254 251 251 282 -	275 257 256 286 286		297 266 268 308	297 268 269 304 -	306 275 277 320	311 276 278 325	314 280 281 330  297	278 274	281 272 340
•	11 12 13 14	Boiler Plant Piping Installed Turbogenerator Units Accessory Electrical Equipment Misc. Power Plant Equipment	314 315 316	268 266 280	264 269 284	262 271 285	261 269 287	265 267 289	264 268 292		285 307 307	290 312 313	292 317 319	298 323	294 332 327	300 325 331	304 337 339
<b>C</b>	15 16 17 18 19 20	Nuclear Production Plant Total Nuclear Production Plant Structures & Improvements Reactor Plant Equipment	321 322	256 234 254	257 234 257	258 234 258	258 236 260	260 236 262	264 240 269	273 243 281	282 249 283	287 249 289	293 259 297	297 260 300	299 262 302	300 261 305	306 266 309
اد ا	21 22 3 24 25	Hydro Production Plant Total Hydraulic Production Plant Structures & Improvements Reservoirs, Dams & Waterways Water Wheels, Turbines & Generators	331 332 333	241 249 231 278	240 248 231 274	241 250 231 276	244 253 235 275	245 254 235 278	257	252 260 242 290	260 266 249 302	262 268 251 304	267 275 256 308	271 276 256 329	271 280 261 309	273 278 258 331	275 281 260 333
<b>)</b>	26 27 28 29 30 31	Other Production Plant Total Other Production Plant Fuel Holders, Producers & Accessories Gas Turbogenerators	342 344	244 256 240	246 258 242	249 262 245	245 264 240	257 266 256	265 270 266	273 278 276	311 287 326	313 289 328	325 299 342	329 306 346	331 305 347	329 309 345	338 314 356
	32 33 34 35 36 37 38	Transmission Plant Total Transmission Plant Station Equipment Towers & Fixtures Poles & Fixtures Overhead Conductors & Devices Underground Conduit	353 354 355 356 357	251 259 259 259 256 243 255	252 260 254 255 250 255	257 261 257 258 265 256	256 262 262 258 258 254 256	252 263 262 258 236 257	257 270 267 260 234 262	262 274 270 265 268 269	286 280 280 282 282 326 277	291 288 282 295 324 287	296 295 288 301 320 293	297 300 289 306 315 292	308 315 290 309 333 294	304 317 284 -324 310 292	314 315 281 334 356 297
	39 40 41 42 43 44	Underground Conductors & Devices  Distribution Plant Total Distribution Plant Station Equipment Poles, Towers & Fixtures	358 362 364	250 242 262	250 244 262	251 247 264	252 245 264	250 248 263	278 252 252 265	277 258 261 268	266 276 276	291 277 289 281	279 299 285	283 302 290	288 322 294	288 324 300	295 322 308
	45 46 47 48 49 50	Overhead Conductors & Devices Underground Conduit Underground Conductors & Devices Line Transformers Pad Mounted Transformers Services-Overhead	365 366 367 368 368 369	260 249 233 219 213 248	263 248 229 218 215 242	270 250 236 218 215 243	263 249 243 220 218 240	254 250 238 218 232 241	255 254 244 216 241 244	276 262 251 220 257 252	310 268 244 216 268 266	313 290 258 228 272 278	312 299 261 226 284 280	311 296 276 233 285 279	319 296 274 231 285 280	310 291 277 231 293 281	336 291 284 231 299 286
ا س	) 1 1 14.	Services-Underground Services-Underground Meters Installed Ştreet Lighting-Overhead	369 370 373	204 211 295	196 213 295	189 212 290	188 216	190 219	196 218	220 206 278	198 204 282	242 195 287	228 190 292	226 196 296	241 191 300	228 195	222 214 311

### E-6

#### COST TRENDS OF ELECTRIC UTILITY CONSTRUCTION

#### PACIFIC REGION (1973=100)

			COST INDEX NUMBERS													
1			1992		1993		1994		1995		1996		1997		1998	
L									T T		Ť				أت	~
ì		F	Jan.	Jul.	Jan.	Jul	Jan.	Jul.	Jac.	Jul.	Jan.	Jui	Jan.	ful.	Jan.	Jul
n	CONSTRUCTION AND EQUIPMENT	R	1	1	1	1	1	1	1	1	)	ı	1	1	1	1
e		C								- 1						
IT	Total Plant-All Steam Generation		306	309	319	320	326	331	339	345	348	348	352	355	361	363
2	Total Plant-All Steam & Nuclear Gen.		305	309	318	320	326	331	339	344	347	348	352	354	360	362
3	Total Plant-All Steam & Hydro Gen.		299	303	312	314	319	325	332	337	340	341	345	348	354	356
4	-									1	į					
5	Steam Production Plant															
6	Total Steam Production Plant		323	324	333	338	347	350	357	364			376	378	382	385
7	Structures & Improvements-Indoor	311	279	284	293	299	304	313	315	321	323	325	329	333	336	339
8	Structures & Improvements-Semi-Outdoor	311 312	266 342	273 343	279 353	286 359	288 365	306 367	307 373	310 379	316 383	321 384	325 390	330 393	330 396	334 399
9	Boiler Plant Equipment-Coal Fired  Boiler Plant Equipment-Gas Fired	312	342	343	323	3,73	202	307	3/3	217	202	304	שכנ	272	סכנ	277
11	Boiler Plant Piping Installed	712	307	300	310	315	319	316	330	337	339	338	344	343	343	- 345
12	Turbogenerator Units	314	307	306		318	333	332	344	349		350	362	362	369	370
13	Accessory Electrical Equipment	315	343	346	360	366	367	370	376	391	395	398	403	408	414	417
14	Misc. Power Plant Equipment	316	341	342	353	359	368	376	384	388	389	392	396	404	405	409
15	_															
16	Nuclear Production Plant															
17	Total Nuclear Production Plant	,,,	308 264	309 270	318 276	322 285	331 291	332 298	339 298	347 302	348 303	350 308	357 313	359 318	364 322	366 324
18	Structures & Improvements Reactor Plant Equipment	321 322	311	311	318		329	328	276 336		345				355	357
20	research russe Equipment	344	311	311	310	321	343	320	330	7		,,,,	331	332	333	33,
	Hydro Production Plant										-					
22	Total Hydraulic Production Plant		273	278	282	289	293	303	304	307	309	313	318	324	328	332
<b>' 23</b>	Structures & Improvements	331	279	284	293	299	304	313	315	321	323	325	329	333	336	
24	Reservoirs, Dams & Waterways	332	258	264	267	275	277	290	290	291	295	298	302	310	312	318
25	Water Wheels, Turbines & Generators	333	332	330	338	338	349	347	356	362	361	365	376	375	386	385
26 27	Other Production Plant															
28	Total Other Production Plant		338	341	351	350	346	345	344	352	355	364	365	366	375	376
29	Fuel Holders, Producers & Accessories	342		314	320	326	328	330	335	340	345	344	352	356	361	364
30	Gas Turbogenerators	344	355			366	359		351	360			372	372	383	384
31	_															
	Transmission Plant															
33	Total Transmission Plant		302			321	327	336		353	356		362	363	373	375
34	Station Equipment	353	312	323	336	335	341	353	360	365	367	365	368	369	381 344	382 347
35 36	Towers & Fixtures Poles & Fixtures	354 355	279 340	283 353	290 352	297 359	301 369	314 376	318 390	321 392	328 393	332 410	338 414	340 419	427	428
37	Overhead Conductors & Devices	356	310	312	337	325	332	333	362	368			378	373	390	391
38	Underground Conduit	357	292	296	300	304	306	311	314	320	318	324	327	331	334	337
39	Underground Conductors & Devices	358		414	421	423	423	423	428	438			444	445	448	450
+0																
41	Distribution Plant						1									
42	Total Distribution Plant	ا ۔ ۔ ا	290	294	303	302	305	310	318	322	326	325	325	328	334	
43	Station Equipment	362	310	326	328	329	325	338	348	357	353	350		353		
44 45	Poles, Towers & Fixtures Overhead Conductors & Devices	364 365	311 312	323 312	328 335	331 329	340 336	350 338	355 358	364 367		371 371		382 377		391
46	Underground Conduit	366	288	290	293	299	302	308	313	317			325	331		
47	Underground Conductors & Devices	367	283	234	292	291	291	291	291				313	314		320
48	Line Transformers	368	232	236	239	237	239	243	242	235	241	237	221	225		228
49	Pad Mounted Transformers	368	295	296	298	306	307	308	298	310	311	323	324	325	326	327
50	Services-Overhead	369	281	278	295	291	295	299	311	317	322	319	316	323	328	330
51	Services-Underground	369	230	219	226	224	227	233	238	242		240	239			239
52	Meters Installed	370		204	214	213	205	198	200	195		202	203	219		222
13 71	Street Lighting-Overhead	373	317	318	332	336		351	356	367	376	386	394	394		397 411
74 55	Mast Arms & Luminaires Installed	373	336	336	1	347	356	369	376	380 363	389 375	407 386	417 393	413 394	415 397	
56	Street Lighting-Underground	373	320	320	334	339	345	351	355	נסנ	213	300	773	477	271	270
	<u> </u>	اا								لــــــــــــــــــــــــــــــــــــــ						

## **E-6**

## COST TRENDS OF ELECTRIC UTILITY CONSTRUCTION

## PACIFIC REGION (1973=100)

1							C	OST I	NDE	X NU	MBE	RS		····		
1			15	99	20	00	20	101	20	02	20	03	20	04	20	05
L		F		Ī						<u> </u>		<u> </u>		<u> </u>		r -
17		E	Jan	Jul.	Jan_	Jul.	lan.	Jui.	Jan.	Jul	Jan.	jul.	Jan.	hul	Jan	Jul.
n	CONSTRUCTION AND EQUIPMENT	ī	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		С	l -	l	`	1	•	•	ļ `	<b>\</b>	Ι'.		•	•	`	١.
1	Total Plant-All Steam Generation	+-	366	365	369	382	387	386	398	403	412	410		_	_	├
2	Total Plant-All Steam & Nuclear Gen.		365	1	368	382	386				411	410				
3	Total Plant-Ali Steam & Hydro Gen.			357	361						1					1
4			] ""	33.	30.	٠,٠٠	3,0	7.0	367	7,73	701	400				
5	Steam Production Plant															
6	Total Steam Production Plant		388	391	397	414	419	416	424	434	445	441				
7	Structures & Improvements-Indoor	311	347	I	351							392			·	
8	Structures & Improvements-Semi-Outdoor	311	4		350				367	369		372				1
9	Boiler Plant Equipment-Coal Fired	312	404	406	410	430				453		450				
10	Boiler Plant Equipment-Gas Fired	312	_	-	-		-	-	-			-				
11	Boiler Plant Piping Installed		352	350	348	358	362	36 i	368	375	381	376				
12	Turbogenerator Units	314	369	373	383	396	400	389	399	409	431	429				
13	Accessory Electrical Equipment	315	421	428	434	461	472	472	493	511	522	518				
14	Misc. Power Plant Equipment	316	416	420	426	442	445	446	455	464	469	463				
15	<u>i</u>															
16	Nuclear Production Plant															
17	Total Nuclear Production Plant		368		377		397		405	414	424	422				
18	Structures & Improvements	321			334	349	351		359	369	373	369				
19	Reactor Plant Equipment	322	361	361	365	377	380	380	387	394	399	399				
20	Tinde Decimal The															
22	Hydro Production Plant		377	777	7.77	746	740	240	200	200	350	361				
23	Total Hydraulic Production Plant Structures & Improvements	331		337 346	342 351	346 369	349 374	349 375		356 391	359 397	361 392				
24	Reservoirs, Dams & Waterways	332	319		327	330	333	336		342	344	346	1			
25	Water Wheels, Turbines & Generators	333	382		395		400			392		405				
26	manual resources of Octobrations	737	702	,,,,	3,75	3,50	700	300	3,70	372	337	403				
27	Other Production Plant															
28	Total Other Production Plant		387	390	396	421	427	402	409	420	427	428				
29	Fuel Holders, Producers & Accessories	342	374		372	383	384	386	391	399	404	403				
30	Gas Turbogenerators	344	398	401	408		401	408		426	433	435				
31	_															
32	Transmission Plant															
33	Total Transmission Plant		376		373	395	398	401		411	415	413				
34	Station Equipment	353		388	391	415	419	421		434						
35	Towers & Fixtures	354		354	365	368	373	377	384	385	388	389				
36	Poles & Fixtures	355		419	413	422	425	432		448	454	456				
37	Overhead Conductors & Devices	356		354	356	398	399	403	416	406	411	412			.	
38	Underground Conduit	357 358	354 453	346 463	348 453	355 458	358 468	360 447	374 462	381 466	390 474	389 475				1
40	Underground Conductors & Devices	228	433	+03	423	728	409	44/	402	400	4/4	4/3				
41	Distribution Plant					- 1	1	1	- 1	ı		1	- 1	-		
42	Total Distribution Plant		330	336	338	346	350	351	366	369	376	378	ı			ĺ
43	Station Equipment	362	374		377	379	382	383	391	383	388	387	· i	1	1	- 1
44	Poles. Towers & Fixtures	364	390		391	398	400	403	420	426	434	437	ı			1
45	Overhead Conductors & Devices	365		Ή	381	410	413	416	438	437	449	451	- 1	į		
46		366	343	347	353		361					394	ı			1

CA-IR-101 DOCKET NO. 04-0113 PAGE 1 OF 2

## CA-IR-101

Please provide a schedule showing the capital structure ratios (common equity, long-term debt, short-term debt, preferred stock and hybrid securities) for HECO and HEI for each year from 1999 to 2004.

## **HECO Response:**

The requested schedule showing the capital structure ratios for HECO (Oahu only) and HEI for each year from 1999 to 2004 is attached.

## Capital Structure Ratios

HECO (Oahu only)						
Years ended December 31	2004	2003	2002	2001	2000	1999
Short-term borrowings	5.2%	1.9%	1.3%	4.0%	8.6%	8.7%
Hybrids	2.5%	5.4%	5.5%	5.6%	5.7%	5.9%
Long-term debt	36.7%	38.8%	39.4%	38.0%	36.9%	36.1%
Preferred stock	1.9%	2.0%	2.0%	2.1%	2.1%	2.2%
Common equity	53.8%	52.0%	51.9%	50.3%	46.7%	47.2%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
•						
HEI						
Years ended December 31	2004	2003	2002	2001	2000	1999
Short-term borrowings	3.1%	0.0%	0.0%	0.0%	4.6%	6.9%
Long-term debt, net *	46.9%	44.6%	46.4%	49.6%	48.1%	44.2%
HEI- and HECO-obligated preferred						
securities of trust subsidiaries *	0.0%	8.4%	8.4%	8.7%	8.8%	9.0%
Preferred stock of subsidiaries	1.4%	1.4%	1.4%	1.5%	1.5%	1.6%
Common stock equity	48.6%	45.6%	43.8%	40.2%	37.0%	38.3%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

<sup>\*</sup> Effective 1/1/04, HECO-obligated preferred securities of trust subsidiaries were deconsolidated. For financial statement purposes in 2004, HEI reflects the long-term debt payable to the trust in long-

Please provide copy of all reports by rating agencies that evaluate HECO and/or HEI for the period 1999 to the present.

### **HECO Response:**

Available reports by rating agencies that evaluate HECO and/or HEI for the period 2004 to the present are voluminous and therefore one copy each will be provided to the Consumer Advocate and Commission under separate transmittal. Available reports by rating agencies for the period 1999 to 2003 are too voluminous to reproduce but can be reviewed at HECO's office upon request. Please contact Irene Sekiya at 543-4778 to arrange for review.

Note: Most (if not all) of the information requested is copyrighted. The attached copy is being provided under the "fair use" exception to the copyright laws. Any copies made of the attachment are subject to the copyright laws.

CA-IR-102 DOCKET NO. 04-0113 PAGE 1a of 73

Due to the voluminous nature of the information, one copy (pages 2-73) will be provided to the Consumer Advocate and the Public Utilities Commission under separate transmittal.

Please provide copy of all reports by security analysts that evaluate HECO and/or HEI for the

## **HECO Response:**

HECO's common stock is not publicly traded therefore security analysts do not separately report on HECO. Reports by security analysts that evaluate HEI for the period 2004 to the present that we are aware of are voluminous and therefore one copy each will be provided to the Consumer Advocate and the Commission under separate transmittal. Security analyst reports for the period 1999 to 2003 that we are aware of are too voluminous to reproduce but can be reviewed at HECO's office upon request. Please contact Irene Sekiya at 543-4778 to arrange for review.

Note: Most (if not all) of the information requested is copyrighted. The copy is being provided under the "fair use" exception to the copyright laws. Any copies made of the attachment are subject to the copyright laws.

Due to the voluminous nature of the information, one copy (pages 2-159) will be provided to the Consumer Advocate and the Public Utilities Commission under separate transmittal.

CA-IR-104 DOCKET NO. 04-0113 PAGE 1 OF 4

### CA-IR-104

Please provide a schedule showing the credit ratings of HEI, HECO, HELCO and MECO by each of the major credit rating agencies (i.e., Fitch, Moody's, and Standard & Poor's) for each year from 1990 to the present.

## **HECO** Response:

See the attached sheets for available information on the ratings for HECO, HELCO, MECO and HEI.

## **RATING HISTORY**

2/6/2005

#### HAWAIIAN ELECTRIC COMPANY

S&P Corporate Credit Rating: BBB+ Moody's Issuer Rating: Baa1

	8&P	**	М	OODY'S	DUFF & F	PHELPS ***	F	TCH ***
RATING	DATE		RATING	DATE	RATING	DATE	RATING	DATE
A-	10/14/97	First mortgage bonds +	A3	11/15/91	A	7/18/91	Α-	4/19/93
BBB+	2/8/93	v	A2	11/13/90			A+	4/4/79
Α-	11/16/90		A1	12/13/89			Α	Pre 1976
Α	11/30/87		Aa3	12/8/86				
<b>A</b> +	4/19/82		A1 *	4/26/82				
Α	8/26/74		Α	1944				
AAA	1990	Revenue bonds (insured)	Aaa	1990				
BBB+	5/17/1995	Revenue bonds	Baa1	11/15/91	A-	7/18/91		
BBB	2/8/93	(uninsured) +	A3	11/13/90				
BBB+	11/16/90		A2	12/13/89	•			
A-	11/30/87		A1	12/8/86	-			
Α	4/19/1982		A2 *	4/26/82	Ţ.			
			Α	Prior to 1982				
BBB+	5/17/1995	Medium term notes +	Baa1	12/22/1993	Α-	12/7/1993		
BBB	11/24/1993							
NR	1/15/99	Preferred stock	Baa3	7/27/01	BBB+	7/18/91	BBB+	4/19/93
BBB	2/8/93		baa2	12/10/98			Α	10/3/86
BBB+	11/16/90		baa1	11/15/91	•		A-	10/10/80
A-	11/30/87		a2	11/13/90	*		BBB+	Btwn '76 & '79
A+	4/19/82		a1	12/13/89	•		BBB	3/7/76
Α	9/13/74		aa3	12/8/86				
			a1 *	4/26/82				
			а	1944				
A-2	11/16/90	Commercial paper	P-2	11/15/91	Duff 1-	7/18/91		
A-1	11/30/87		P-1	1944				
A-1÷	2/10/84							
A-1	8/19/77							
BBB-	2/22/99	Preferred securities	Baa2	7/27/01	BBB+	4/24/97		
BBB	2/27/1997		baa1	3/24/1997				

<sup>\*</sup> On 4/26/82, Moody's refined its rating system and added numerical designations to the ratings. On 6/19/01, Moody's outlook for HEI and HECO securities was revised to stable from negative.

<sup>\*\*</sup> On 1/3/95, S & P's outlook for HEI, HECO, HELCO and MECO's securities was revised to stable from negative. On 6/26/95, S & P's outlook for HEI, HECO, HELCO and MECO's securities was revised to positive from stable. On 5/29/98, S & P's outlook for HEI, HECO, HELCO and MECO's securities was revised to stable from positive. On 3/7/00, S & P's outlook for HEI, HECO, HELCO and MECO's securities was revised to negative from stable. On 5/8/02, S & P's outlook for HEI, HECO, HELCO and MECO's securities was revised to stable from negative.

<sup>\*\*\*</sup> Not paid to rate the securities, thus not verified whether ratings are current.

<sup>+</sup> There are no longer any first mortgage bonds, medium term notes or uninsured revenue bonds outstanding.

PAGE 3 OF 4

## **RATING HISTORY**

2/6/2005

### HAWAII ELECTRIC LIGHT COMPANY

	\$&P**		MOC	DDY'S	DUFF 8	PHELPS
RATING	DATE		RATING	DATE	RATING	DATE
BBB+ BBB	5/17/1995 11/29/1993	Revenue bonds (uninsured) +	Baa1 A3 A2	11/15/1991 11/13/1990 12/13/1989	NR	
BBB+ BBB	5/17/1995 11/24/1993	Medium term notes +	Baa1	12/22/1993	A-	12/7/1993

### MAUI ELECTRIC COMPANY

S	****		MOC	DDY'S	DUFF &	PHELPS
RATING	DATE		RATING	DATE	RATING	DATE
BBB+ BBB	5/17/1995 11/29/1993	Revenue bonds (uninsured) +	Baa1 A2	11/15/1991 12/13/1989	NR	
BBB+ BBB	5/17/1995 11/24/1993	Medium term notes +	Baa1	12/20/1993	Α-	12/7/1993

<sup>\*\*</sup> On 1/3/95, S & P's outlook for HEI, HECO, HELCO and MECO's securities was revised to stable from negative On 6/26/95, S & P's outlook for HEI, HECO, HELCO and MECO's securities was revised to positive from stable. On 5/29/98, S & P's outlook for HEI, HECO, HELCO and MECO's securities was revised to stable from positive. On 3/7/00, S & P's outlook for HEI, HECO, HELCO and MECO's securities was revised to negative from stable. On 5/8/02, S & P's outlook for HEI, HECO, HELCO and MECO's securities was revised to stable from negative.

<sup>+</sup> There are no longer any medium term notes or uninsured revenue bonds outstanding.

## RATING HISTORY

2/6/2005

## HAWAIIAN ELECTRIC INDUSTRIES

S&P Corporate Credit Rating: BBB

	S&P **	ŧ	MOC	DDY'S *	DUFF & P	HELPS ***
RATING	DATE		RATING	DATE	RATING	DATE
BBB BBB+ A-	2/8/93 11/16/90 10/28/88	Medium term notes (sr unsecured)	Baa2 Baa1 A3 A1	11/15/91 11/13/90 7/26/90 11/8/88	BBB+ A-	2/26/93 7/18/91
A-2 A-1	11/30/87 2/6/85	Commercial paper	P-2 P-1	7/26/90	Duff 2 Duff 1-	6/14/94 7/18/91
BB+ BBB-	2/22/99 12/30/96	Preferred securities +	Ba1 baa3	7/27/01 1/10/97	BBB	2/3/97

<sup>\*</sup> On 4/26/82, Moody's refined its rating system and added numerical designations to the ratings. On 6/19/01, Moody's outlook for HEI and HECO securities was revised to stable from negative.

<sup>\*\*</sup> On 1/3/95, S & P's outlook for HEI, HECO, HELCO and MECO's securities was revised to stable from negative. On 6/26/95, S & P's outlook for HEI, HECO, HELCO and MECO's securities was revised to positive from stable. On 5/29/98, S & P's outlook for HEI, HECO, HELCO and MECO's securities was revised to stable from positive. On 3/7/00, S & P's outlook for HEI, HECO, HELCO and MECO's securities was revised to negative from stable. On 5/8/02, S & P's outlook for HEI, HECO, HELCO and MECO's securities was revised to stable from negative.

<sup>\*\*\*</sup> Not paid to rate the securities, thus not verified whether ratings are current.

<sup>+</sup> There are no longer any preferred securities outstanding.

Please provide copy of credit rating agencies' documents relied upon in making following statements:

- a. Imputed debt for PPAs, page 26, lines 17-23 of HECO T-21, and
- b. Equity credit for hybrid securities, page 26, lines 24-25 and page 27, lines 1-2 of HECO T-21.

## **HECO Response:**

- a. An S&P article discussing credit rating implications of purchase power contracts was provided in HECO-2111. In addition, HECO management has had on-going dialogue with the credit rating agencies regarding credit rating implications of purchase power contracts over the past several years.
- b. See attached S&P article "A Hierarchy of Hybrid Securities." In addition, HECO management has also had on-going dialogue with the credit rating agencies regarding equity credit for hybrid securities over the past several years.

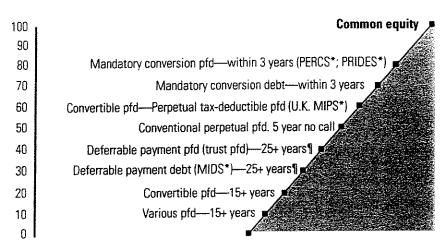
E\_STANDASD & PODR'S...

# A Hierarchy of Hybrid Securities

Issuers and their advisers have requested a handy gauge of the equity credit that Standard

because they have a damaging—or negative—impact on credit quality. Some aspect or aspects of these securities may allow them to

## **Relative Equity Impact**



The scale presented here is intended as a communication device. It is not a substitute for analysis. It should not be interpreted as a tool for quantification of hybrids with respect to ratio calculations. The values on the scale should NOT be construed as a way to parse hybrid instruments into debt and equity components when calculating a company's leverage. Indeed, those seeking to reduce hybrid analysis to precise formulas could be harboring a delusion regarding the nature of the credit-rating process.

Note also that the rating impact of two instruments that are 10 or 20 percentage points apart on the scale will normally be the same. In the scheme of things, such small distinctions in equity content have marginal implications at best.

<sup>\*</sup> Trade name of specific banking firm product, for illustration purposes only.

<sup>¶</sup> Remaining life; initially issued with 30+ years' life.

E STANDARD & POOR'S

### Some other hybrids

### Mandatory exchangeable debt or preferred (e.g., DECs)

If the issue must be settled with the stock of another entity (which is currently owned by the issuer), the analytical treatment is that of a deferred asset sale. All asset sales may be positive or negative to credit quality; there is no standardized impact. The factors that determine the credit impact include price achieved and use of after-tax proceeds. Will the proceeds be distributed to shareholders? Or used to pay down debt on a permanent basis? Or be reinvested? If reinvested, is the new asset more/less risky than what was sold?

## Mismatched mandatory conversion debt (e.g., FELINE PRIDES)

Given the mismatch, the equity issuance is not ordinarily netted against the debt obligation. It is equivalent to a company simultaneously issuing deferred equity (+80% in the chart above) and a like amount of debt. The net impact of these two issues would depend on whether leverage is increased or decreased, which, in turn, depends on the extent of financial leverage prior to these two issuances.

#### · Step-up preferred

If an instrument provides for adjustment of terms, the analyst may consider the adjustment date as the expected maturity, with the related diminution of equity credit. If the adjustment is to above-market rates, it is presumed that the instrument will be refinanced—and not necessarily with another equity-like security.

### Remarketed convertible trust preferred (e.g., HIGH TIDES)

On balance, this hybrid is viewed negatively, despite the potential for conversion to common and the rate savings created by the remarketing feature. The need to remarket at a level above par could lead to terms that are unpalatable to the issuer, prompting a refinancing.

#### · Auction preferred

These frequently remarketed preferreds are treated virtually as debt. They are sold as commercial paper equivalents, which leads to failed auctions if credit quality ever falls to 'A-3', or even 'A-2', levels. While the company has no obligation to repurchase the paper—the last holder could be stuck with this "perpetual" security—invariably, the issuer chooses to repurchase the preferred, bowing to market pressures to do so.

## Ref: HECO T-21, page 28, lines 16-21.

The witness in the above referenced testimony states that "since its last rate case in 1995, HECO's business risk has increased." Please provide copy of any rating agency reports relied upon in making this statement.

## **HECO Response:**

The assessment that HECO's business risk has increased is based in part on discussions with rating agencies that indicated that the increased business risk necessitated lowering financial risks in order to maintain credit rating. No specific rating agency reports were relied upon in making the statement. The articles provided as HECO-2110 and HECO-2112 show the utility industry in general has greater risk as well as documenting the large number of credit rating downgrades over the past several years. Given HECO's business risk profile and S&P's profile distribution (as shown in HECO-2112), HECO is on the riskier end of the spectrum relative to other utilities. The testimony provides further discussion on why there has been a change in business risk in the industry. These events have caused much greater scrutiny by the credit rating agencies and expectations that companies will meet and exceed their credit rating targets in order to maintain a company's credit rating. There has also been greater scrutiny of a company's liquidity position and balance sheet strength in order to ensure that a company can withstand a cash crunch such as occurred during 9/11.

- a. Please indicate if HECO's calculation of capital structure ratios, as described on pages 30-40 of HECO-T-21, are determined in an identical fashion to that approved by the Commission in recent HECO, HELCO, and MECO rate decisions.
- b. If no, please indicate how HECO's proposals differ from recent Commission decisions and specify the impact of any proposed change.

## **HECO Response:**

a. HECO's calculation of capital structure ratios is consistent with the methodology HELCO used in calculating the capital structure ratios in HELCO 2000 test year rate case (Docket No. 99-0207) which the Commission approved; however, in the HELCO 2000 test year rate case, hybrid securities and preferred stock were combined in the capital structure summary.

HECO's calculation of capital structure ratios is consistent with the methodology MECO used in calculating the capital structure ratios in the MECO 1999 test year rate case (Docket No. 97-0346) which the Commission approved; however, in the MECO 1999 test year rate case, there were no short-term borrowings in the capital structure.

HECO's calculation of capital structure ratios is consistent with the methodology MECO used in calculating the capital structure ratios in MECO's 1997 (Docket No. 96-0040) and 1996 test year rate cases (Docket No. 94-0345) and the methodology HECO used in calculating the capital structure ratios in HECO's 1995 test year rate case (Docket No. 7766) which the Commission approved; however, in Docket Nos. 96-0040, 94-0345 and 7766, there were no hybrid securities in the capital structure. Also, small refinements to certain calculations described in response to CA-IR-108 were made. These changes did not significantly impact the capital structure.

b. See response to part a. above.

- a. Please indicate if HECO's calculation of capital costs, as described on pages 40-44 of HECO T-21, are determined in an identical fashion to that approved by the Commission in recent HECO, HELCO, and MECO rate decisions.
- b. If no, please indicate how HECO's proposals differ from recent Commission decisions and specify the impact of any proposed change.

## **HECO Response:**

a. HECO's calculation of capital costs is consistent with the methodology HELCO used in calculating the capital costs in HELCO 2000 test year rate case (Docket No. 99-0207) and the methodology MECO used in calculating the capital costs in MECO 1999 test year rate case (Docket No. 97-0346) which the Commission approved.

In MECO's 1997 and 1996 test year rate cases, in HELCO's 1996 test year, and in HECO's 1995 test year rate case (Docket Nos. 96-0040, 94-0345, 94-0140 and 7766, respectively) the methodology HECO used in calculating the annual amortizations for long-term debt were calculated in a way that would sometimes result in amounts that wouldn't exactly match the amounts on the books. Since Docket No. 96-0040, the calculations were refined so that annual amortizations would match amounts on the books.

In HECO's 1995 test year rate case (Docket No. 7766), the investment income differential was reflected net of income taxes. Consistent with Financial Accounting Standards Board Statement No. 109, "Accounting for Income Taxes", the investment income differential has been recorded gross of taxes in subsequent rate case applications. As noted in response to CA-IR-107, certain components of the capital structure were not included in certain rate cases. Other than the items noted above, the capital costs of this docket are consistent with the methodology used in the recent dockets discussed above

CA-IR-108 DOCKET NO. 04-0113 PAGE 2 OF 2

(Docket Nos. 99-0207, 97-0346, 96-0040, 94-0345 and 7766) all of which were approved by the Commission.

b. See response to part a. above.

## Ref: HECO T-21 discussion regarding the analysis of HEI impact.

Please provide a copy of all reports by security analysts and rating agencies over the period 1995 to the present that discuss the impact of HEI on HECO's risks and ratings.

### **HECO** Response:

The impact of HEI on HECO is addressed by Mr. William Avera in his affidavit filed as HECO-2118. In addition, Mr. Avera addressed the impact of HEI on HECO for the period up to 1999 as submitted in HELCO 2000 test year rate case (Docket No. 99-0207).

Reports by security analysts and rating agencies that discuss the impact of HEI on HECO's risks and ratings have not been separately identified from those reports that do not have such discussion. Copies of available security analyst reports of HEI for the period 2004 to present have been provided in response to CA-IR-102. HECO's common stock is not publicly traded therefore security analysts do not separately report on HECO. Copies of available rating agency reports of HECO and/or HEI for the period 2004 to present have been provided in response to CA-IR-103.

Available security analyst reports of HEI for the period 1995 to 2003 and available rating agency reports of HECO and/or HEI for the period 1995 to 2003 are too voluminous to reproduce but can be reviewed at HECO's office upon request. Please contact Irene Sekiya at 543-4778 to arrange for review.

Note: Most (if not all) of the information requested is copyrighted. The copy is being provided under the "fair use" exception to the copyright laws. Any copies made of the attachment are subject to the copyright laws.

# Ref: use of 30-year Treasury bonds as risk-free rate in CAPM and risk premium methodologies.

- a. Please indicate if Dr. Morin believes that the US Treasury still issues 30-year bonds.
- b. If no, please explain how Dr. Morin believes that 30-year US Treasury bonds have a measurable yield at the current time.
- c. Please provide a copy of any sources of 30-year Treasury bond yields that Dr. Morin is aware of.

## Dr. Morin's Response:

- a. The U.S. Treasury no longer issues 30-year Treasury bonds. Given the record federal deficits, however, it would not be unreasonable to anticipate a reversal of that policy.
- b. Although, no new issues of 30-year Treasury bonds are forthcoming, existing 30-year Treasury bonds do trade. In the same way that we can use stock prices in the application of the DCF model to a given company even though that company has not issued stock in the recent past, we can rely on bond prices of 30-year Treasury bonds and the implied yields. 30-year Treasury bonds are actively traded on secondary markets and provide useful price/yield signals.
- c. Dr. Morin relied on bond yields published in the Value Line Investment Analyzer software in the Selection & Opinion section. See the enclosed for a recent sample from the Value Line Investment Survey which replicates the Selection & Opinion information contained in the Value Line Investment Analyzer.



PAGES 1975-1982

File in page order in the Selection & Opinion binder.

PART 2

## Selection & Opinion

DECEMBER 10, 2004

## The Value Line View

## In This Issue

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The Selection & Opinion Index appears on page 1986 (December 3, 2004).

In Three Parts: Part 1 is the Summary & Index. This is Part 2, Selection & Opinion. Part 3 is Ratings & Reports. Volume LX, Number 15.

#### ECONOMIC AND STOCK MARKET COMMENTARY

The economy is giving off mostly positive signals as we proceed through the fourth quarter. Recent data, for example, detail that the gross domestic product rose by a healthy 3.9% in the third quarter, buoyed by higher consumer spending and a rise in sales of American-made goods overseas. Moreover, personal income, housing, and manufacturing activity are all holding up well. On the other hand, the employment outlook is mixed, with a lessthan-expected 112,000 jobs added in November. All told, GDP growth is likely to come in at about 3.5% in the current quarter.

There is enough momentum in place, in our view, to ensure that we'll start the new year on a fairly upbeat note. One hopeful sign is that certain retailers are reporting fairly brisk sales activity, particularly at the high-end stores and for online purchases. Such strength augurs well for this holiday season being a fairly decent one. Low mortgage rates, in the meantime, are good news for the housing market as we head into 2005. One disquieting note is the sharp increase in gasoline prices over the past year, a surge that along with higher home heating bills will have a restraining effect on retail spending for the start of the start

weeks. Adding it all up, we think that GDP growth will stay above 3% in the opening quarter of 2005.

Uncertainty could well increase thereafter. Two obvious questions concern the price of oil and the extent to which the Federal Reserve will have to raise interest rates before it is satisfied that stability can be achieved on the inflation front. Assuming oil prices average \$40-\$50 a barrel in 2005 and the Fed only raises the Federal Funds rate from the current 2.00% to 3.00%, the business upturn probably would stay on track, with GDP growth averaging 3.0%-3.5%.

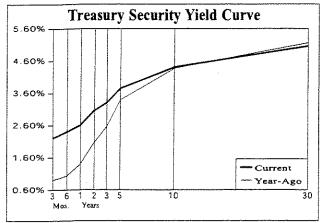
The stock market is maintaining an air of confidence. Taking a cue from the healthy economy, increasing earnings, benign inflation, and low interest rates, stocks are now well into the plus column for the year.

Conclusion: The outlook for the economy, meantime, appears sound enough for the stock market to hold its own in 2005, barring any setbacks overseas, most notably with respect to the fighting in Iraq or the war on terrorism. Please refer to the inside back cover of

#### PAGE 1979

## Selected Yields

	Recent (12/02/04)	3 Months Ago (9/02/04)	Year Ago (12/04/03)		Recent (12/02/04)	3 Months Ago (9/02/04)	Year Ago (12/04/03)
AXABLE							
Market Rates				Mortgage-Backed Securities			
Discount Rate	3.00	2.50	2.00	GNMA 6.5%	4.62	4.43	4.48
Federal Funds	2.00	1.50	1.00	FHLMC 6.5% (Gold)	4.47	4.41	4.43
Prime Rate	5.00	4.50	4.00	FNMA 6.5%	4.31	4.39	4.46
30-day CP (A1/P1)	2.18	1.52	1.05	FNMA ARM	2.92	2.78	3.03
3-month LIBOR	2.44	1.81	1.18	Corporate Bonds			
Bank CDs				Financial (10-year) A	5.34	5.16	5.53
6-month	1.52	1.01	0.73	Industrial (25/30-year) A	5.79	5.78	5.92
1-year	1.82	1.47	0.88	Utility (25/30-year) A	5.78	5.78	5.93
5-year	3.44	3.55	3.03	Utility (25/30-year) Baa/BBB	6.17	6.22	6.30
U.S. Treasury Securities				Foreign Bonds (10-Year)			
3-month	2.21	1.59	0.91	Canada	4.46	4.64	4.86
6-month	2.40	1.79	1.03	Germany	3.83	4.07	4.45
1-year	2.60	1.99	1.39	Japan	1.42	1.50	1.45
5-year	3.75	3.39	3.39	United Kingdom	4.68	4.97	5.05
10-year	4.41	4.21	4.37	Preferred Stocks			
30-year	5.06	5.00	5.16	Utility A	N/A	6.84	6.85
30-year Zero	5.19	5.16	5.28	Financial A	6.02	5.98	5.95
•				Financial Adjustable A	5.34	5.39	5.48



#### TAX-EXEMPT **Bond Buyer Indexes** 20-Bond Index (GOs) 4.63 4.63 4.73 25-Bond Index (Revs) 5.09 5.19 5.15 General Obligation Bonds (GOs) 1-year Aaa 2.05 1.48 1.13 1-year A 1.63 1.30 2.17 5-year Aaa 2.87 2.63 2.50 5-year A 3.10 2.89 2.85 10-year Aaa 3.69 3.50 3.63 10-year A 3.96 3.84 4.05 25/30-year Aaa 4.70 4.77 4.78 25/30-year A 4.99 4.91 5.00 Revenue Bonds (Revs) (25/30-Year) 4.95 4.95 4.91 Education AA Electric AA 4.86 4.85 4.85 Housing AA 5.00 4.97 5.00 Hospital AA 5.20 5.20 5.20 Toll Road Aaa 5.07 4.92

## Federal Reserve Data

#### **BANK RESERVES**

(Two-Week Period; in Millions, Not Seasonally Adjusted)

	Recent Levels		Averaç	je Leveis Ove	r the Last
11/24/04	11/10/04	Change	12 Wks.	26 Wks.	52 Wks.
1694	1909	-215	1678	1680	1515
294	100	194	246	224	148
1400	1809	-409	1433	1456	1367
	1694 294	<b>11/24/04 11/10/04</b> 1694 1909 294 100	<b>11/24/04 11/10/04 Change</b> 1694 1909 -215 294 100 194	11/24/04         11/10/04         Change         12 Wks.           1694         1909         -215         1678           294         100         194         246	11/24/04         11/10/04         Change         12 Wks.         26 Wks.           1694         1909         -215         1678         1680           294         100         194         246         224

### MONEY SUPPLY

(One-Week Period; in Billions, Seasonally Adjusted)

,		Recent Levels	, ,	Growti	Rates Over	the Last
	11/22/04	11/15/04	Change	3 Mos.	6 Mos.	12 Mos.
M1 (Currency+demand deposits)	1370.7	1346.6	24.1	4.4%	5.0%	6.5%
M2 (M1+savings+small time deposits)	6379.2	6370.8	8.4	4.0%	2.6%	5.2%
M3 (M2+large time deposits)	9299.9	9292.8	7.1	0.1%	1.1%	5.2%

Please provide a copy of Value Line Investment Analyzer, as cited on page 22, lines 16-18 of HECO T-20.

### Dr. Morin's Response:

The information contained in the Value Line Investment Analyzer software cannot be supplied electronically in order to avoid violation of copyright laws. The Value Line Investment Analyzer software is made commercially available to investors on a paid subscription basis on CD-ROMs updated monthly, and cannot be replicated or disseminated without violating copyright laws. The Value Line data are proprietary to Value Line, and are available by subscription. Material that is proprietary can be made available for inspection upon reasonable prior notice at the Company's premises during normal working hours by arrangement. Dr. Morin notes that much of the information contained in the Value Line Investment Analyzer software is replicated in the paper version known as the Value Line Investment Survey. The same data is available in paper format from the latest edition of the traditional Value Line Investment Survey coinciding with the month of publication of the software version. Such reports are available at most university libraries in paper format.

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## CA-IR-112

Please provide a copy of May 2004 edition of Consensus Economics Inc.'s "Consensus Forecast' as cited on page 22, lines 19-23 of HECO T-20.

## Dr. Morin's Response:

See pages 2 and 3 of this response.

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Survey Date:	Gross Domestic Product	mestic	Personal Consumption	ial otion	Investment	rent	Corporate Profits	rate	Industrial Production	trial ction	Consumer Prices	mer es	Producer Prices	icer	Wages	
10-May-2004	real, % change 2004 2005	hange 2005	real, % ch 2004	hange 2005	real, % change 2004 2005		nominal, % change 2004 2005	change 2005	real, % change 2004 2005	hange 2005	% change 2004 20	<sup>1ge</sup> 2005	% change 2004 20	0.5	% change 2004	2005
U.S.A.																
The Conference Board	5.0	4.8	4.2	4.5	10.2	10.2	23.1	15.9	5.8	8.3	2.2	2.7	8. 1.8	0.0	3.1	3.6
Bear Stearns	4.9	4.3	4.2	4.2	8.9	8.4	24.5	10.1	4.9	5.0	2.1	6.1	2.5	0.2	3.5	3.8
DuPont	4.8	3.4	3.8	3.0	9.4	6.7	18.0	0.6	4.7	4.2	2.3	2.5	2.3	1.5	3,4	3.4
Morgan Stanley	4.8	3.9	4.1	3.6	11.7	11.4	21.4	3.7	4.7	5.3	2.2	2.3	2.6	2.2	มล	<b>#</b>
Standard & Poor's	4,8	3.5	3.9	2.9	11.8	4.9	na	เม	na	na	2.2	1.5	113	B	na	2
Eaton Corporation	4.8	4.2	ю 90	3.5	10.3	10.6	26.1	14.1	4.8	5.2	2.2	2.4	6:1	0.1	3.4	3.5
JP Morgan	4.7	3.8	3.9	3,5	10.1	6.7	22.1	50 E.	5.6	5.4	2.2	2.1	3.0	2,4	3.7	3,4
Mortgage Bunkers Assoc	4.7	3.9	3.9	3.0	10.7	11.7	19.1	10.4	5.0	6.4	2.3	2.4	3.2	1.5	กล	กล
Nat Assn of Home Builders	4.7	4.1	4.0	3,4	10.3	10.9	20.4	8.0	5.1	5.6	2.1	2.0	2.9	1.9	4.2	3.5
Есопопу.сот	4.7	3.5	4.	3.3	11.5	9.2	19.1	0.0	4.5	3.2	6:	1.3	3.0	1.2	3.7	3.6
Macroecononic Advisors	4.7	4.	4.0	3.7	10.6	11.2	17.5	5.8	4.8	9.9	1.9	1.5	2.9	0.7	กล	113
Inforum - Univ of Maryland	4.6	3.7	3.9	3.1	6.6	7,4	9.5	2.0	5.3	4,4	2.3	2.3	2.7	1.3	ā	na
Lehman Brothers	4,6	3.9	4.0	3,4	10,4	8:	23.9		00.	4.5	2.4	2.1	มล	ПB	3.7	3.6
Oxford Economics	4.6	3.9	3.8	3.3	9.6	8.1	25.9	14.2	4.4	4.0	2.3	2.4	5.6	1.7	3.6	3.6
United States Trust	4.6	an a	4.0	na	11.0	na	25.0	กล	5.3	na	2.2	na	na	กล	118	E
Univ of Michigan - RSQE	4.6	4.1	4.0	4.0	9.4	9.6	20.4	5.6	5.7	7.1	2.5	2.2	2.4	0.5	ทล	g
Wells Capital	4.6	3.7	3.9	3.3	10.8	<u> </u>	17.5	6.7	4.8	4.4	∞;	2.4	3.5	4.1	3.5	3.8
General Motors	4.6	3.6	4.0	3.3	10.5	9.5	17.4	3.5	4.8	5.7	2.4	2.6	2.7	1.7	4.1	3.7
Credit Suisse First Boston	4.5	4.0	4.0	3.2	8'6	<b>8</b> .	16.4	0.0	5,2	4.0	2.0	1.7	80	na	มล	na
Ford Motor Corp	4.5	3.5	3.9	3.1	9.2	9.3	na	na	4.7	5.7	6.1	1.9	8.	8.0	เม	na
Daimler Chrysler	4.5	3.5	3.9	3.2	8.5	6.3	17.2	0'9	4.5	ष. व	2.2	2.0	2.7	1.5	na	na
Northern Trust	4.5	na	3.7	na	9.5	na	811	118	3.9	na	2.3	na	80	na	มล	118
Wachovia Corp	4.5	3.5	3.5	2.6	4.	6.4	17.4	13.7		5.7	2.3	2.5	2.6	2.7	3.6	3.7
Georgia State University	4.5	3,4	33 80	2.9	9.1	6.9	14.9	4.3	6.0	9.9	2.2	2.3	1.4	0.0	2.7	
Econ Intelligence Unit	4.5	3.2	4.1	3.0	n	นน	뙲	na	4.6	4.0	2.0	2.3	1.7	1.5	Пâ	¥C
Merrill Lynch	4.4	3,5	3.9	2.9	9.4	9.0	<u>e</u>	Ŋa	4.9	3,9	2.0	<u>E.1</u>	na	na	na	iE E
Famie Mac	<u>4</u> E.	<b>с</b> . 86	3.6	3.2	12.0	8. 5.	5.9	6,4	8,9	5.2	2.3	2.1	<b>—</b>	0.3	រាង	2 OF 3
																\$
Consensus (Mean)	4.6	3,00	3.9	3.3	10.2	9.0	19.2	7.7	5.0	5.2	2.2	2.1	2.5	1.4	3.6	3.6
High	5.0	4.8 8.	4.2	4.5	12.0	E.8	26.1	15.9	0'9	8.3	2.5	2.7	3,5	4.1	4.2	3.8
Low	4. c	3.2	3.5	2.6	ໝູ່ ຜູ້ເ	¢. 4	5.9	4 .	3,9	3.2	<del>-</del> 8.	2	4.	0.0	2.7	3.4
Standary Deviation	V.6	ŧ.	7'0	4.0	) )	?	٥,٠	4.7	Ċ.>	1.2	0.2	0.4	9'0	1.0	0.4	0.1

FY03/04 FY04/05 In 3m In 12m In 3m  10	2	currence hn	local currence has	col currence by	0	%	main riela	70
-639 na na 1;5 3;3 4,6  na 425 na 1;3 2;7 4,7  -606 -425 -335 1;2 2;2 4,9  -584 -483 -349 1;2 2;2 4,9  -584 -483 -349 1;2 2;2 4,9  -586 -475 -425 1;4 2;3 4,7  -542 -474 -401 1;3 2,8 4,9  -542 -474 -401 1;3 2,8 4,9  -543 -474 -401 1;3 2,8 4,9  -544 -483 -374 1;1 2,2 4,8  -545 -474 -401 1;3 2,8 4,9  -547 -451 -457 1;2 3,0 4,3  -551 -451 -457 1;2 3,0 4,3  -600 -450 -405 1;1 2,2 4,8  -600 -450 -405 1;1 2,0 4,4  -600 -450 -405 1;1 2,0 4,4  -600 -470 -533 na		2005	FY03/04	FY04/05	In 3m	In 12m	In 3m	In 12m
639 na na 1.5 3.3 4.6  na 425 na 1.3 2.7 4.7  -606 425 -375 1.2 2.5 4.5  -606 425 -375 1.2 2.2 4.9  -584 483 -349 1.2 2.2 4.9  -586 475 -425 1.4 2.3 4.7  -586 475 -425 1.5 2.2 4.9  -542 na na 1.4 2.1 4.7  -542 -474 -401 1.3 2.8 4.9  -551 483 -374 1.1 2.2 4.8  -600 450 450 1.2 2.3 4.8  -600 450 400 1.2 2.3 4.8  -600 470 -357 1.5 2.6 4.8  -600 470 -371 1.3 2.2 4.8  -600 470 -371 1.3 2.2 4.8  -600 470 -371 1.3 2.2 4.8  -600 470 -371 1.3 2.1 4.7  -600 470 -373 na na na na na na na na -396 -366 1.3 2.4 4.8  -577.3 459.5 -402.3 1.3 2.4 4.8  -605 -522 -469 1.2 2.1 4.7  -605 -522 -469 1.2 2.1 4.7  -605 -322 -469 1.3 2.4 4.8  -605 -320 -326 1.3 2.4 4.8  -606 -479 -333 na na na na na na na na -396 -366 1.3 2.4 4.8  -606 -479 -533 na -396 -366 1.3 2.4 4.8								
na 425 na 1.3 2.7 4.7  -666 425 -375 1.2 2.5 4.5  -584 483 -349 1.2 2.2 4.9  -586 475 425 1.4 2.3 4.7  -586 475 425 1.4 2.3 4.7  -542 na na 1.4 2.1 4.7  -550 481 -375 1.5 2.9 4.4  -551 483 -374 1.1 2.2 4.8  -620 425 -375 1.0 2.0 4.7  -511 483 -374 1.1 2.2 4.8  -600 450 400 1.2 2.3 4.8  -600 450 400 1.2 2.3 4.8  -600 450 400 1.2 2.3 4.8  -600 450 400 1.2 2.3 4.8  -600 479 -331 1.3 2.1 4.7  -605 -522 469 1.2 2.1 4.7  -605 -522 -469 1.2 2.1 4.7  -606 -479 -533 na	584	-639	na	118	1.5	3.3	4.6	5.3
	ПВ	na	425	na	1.3	2.7	4.7	5.6
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-492.8 -396.3 -349.1 1.5 3.3 5.1 -660.5 -522.0 -532.6 0.9 2.0 4.3	5.8	-577.3	-459.5	402.3	1.3	2.4	4.7	5.2
-660.5 -522.0 -532.6 0.9 2.0 4.3	5.3	-492.8	-396.3	-349.1	<u>.</u>	3,3	5.1	5.6
C.F. C.	7.8	-660.5	-522.0	-532.6	00	20	43	7
27 77 77 77	ο <b>.</b>	43.5	31.5	440	}	4 C	} C	5. C

## Ref: T-20, page 18, lines 22-25 and page 19, lines 1-4.

In the above referenced testimony the witness states that "caution and judgment are required in interpreting the results of the DCF model." Please indicate what "caution and judgment" are required in interpreting the CAPM and risk premium models.

### Dr. Morin's Response:

Caution and judgment are required when relying on any model in the social sciences, including financial models. Models represent simplified abstractions of reality so as to improve our understanding of socio-economic phenomena.

In the case of financial models, the DCF model is particularly sensitive to fundamental and structural changes, for it assumes constant infinite growth in book value, earnings, dividends, and stock price forever.

Caution has to be used in applying the DCF model to utility stocks for three reasons. The first reason is that the stock price used as input in the dividend yield component may be unduly influenced by continued structural changes and changing investor expectations in the utility industry. Stock prices are also influenced by mergers and acquisitions possibilities, by speculation concerning asset restructurings and deregulation of certain assets, and by corporate

The second reason is that the traditional DCF model is based on a number of assumptions, some of which are unrealistic in a given capital market environment. For example, the standard infinite growth DCF model assumes a constant market valuation multiple, that is, a constant price-earnings (P/E) ratio. That is, the model assumes that investors expect the ratio of market price to dividends (or earnings) in any given year to be the same as the current

price/dividend (or earnings) ratio. This must be true if the infinite growth assumption is made. This is somewhat unrealistic under current conditions. The DCF model is not equipped to deal with sudden surges in market-to-book (M/B) and price-earnings (P/E) ratios, as was experienced by several utility stocks, in recent years.

The equity market's behavior in the 1990s and 2000s does not comport well with the assumptions of the basic standard DCF model. Several fundamental and structural changes have transformed, and continue to do so, the utility industry from the times when the standard DCF model and its assumptions were developed by Professor Gordon. These changes suggest that some of the raw assumptions underlying the standard DCF model are questionable, and that the DCF model should be at least complemented by alternate methodologies to estimate the cost of common equity.

Contrary to the standard DCF assumption of a constant price/earnings ratio, stock price may not necessarily be expected to grow at the same rate as earnings and dividends by investors. This is especially true in the short run. Investors may very well assume that the price/earnings ratio will in fact continue to increase in the short run, fueling the expected rate of return. The converse is also true. Price/earnings ratios have proved volatile and unstable in recent years. The essential point is that the constancy of the price/earnings ratio required in the standard DCF model may not always be a valid assumption. To the extent that increases (decreases) in relative market valuation are anticipated by investors, especially myopic investors with short-term investment horizons, the standard DCF model will understate (overstate) the cost of equity.

Another way of stating the same point is that the DCF model does not account for the ebb and flow of investor sentiments over the course of the business cycle. This problem is

particularly acute at this time where investors, faced with very low returns on short-term fixed-income securities and an uncertain market outlook, seek the higher yields offered by utility stocks in a so-called flight to quality, boosting their stock price and lowering their dividend yield.

The third reason for caution and skepticism is that application of the DCF model produces estimates of common equity cost that are consistent with investors' expected return only when stock price and book value are reasonably similar, that is, when the M/B is close to unity. Application of the standard DCF model to utility stocks understates the investor's expected return when the market-to-book ratio of a given stock exceeds unity. This is

	particularly relevant in the current assistal montas anxienam anti-described and the current assistal and the current assistance					
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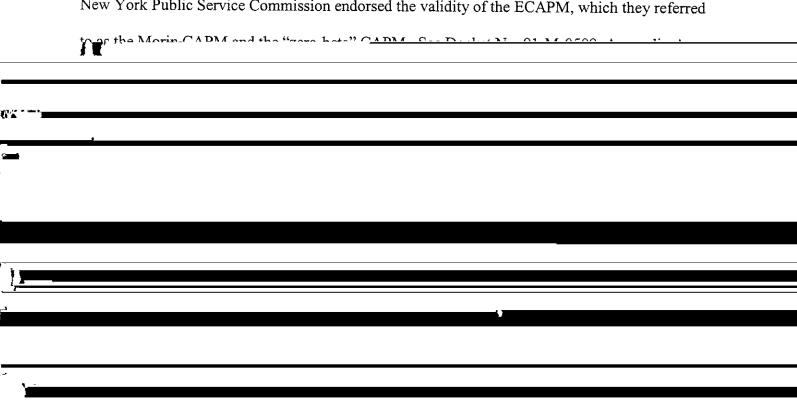
investors are greedy and risk averse, that they can diversify company-specific risks by holding large portfolios, and that enough investors possess similar expectations to trigger the arbitrage process.

Please identify any regulatory commission(s) that Dr. Morin is aware of who has(ve) adopted his version of the empirical CAPM and provide citations to the specific Decision and Orders discussing the adoption of Dr. Morin's proposal.

### Dr. Morin's Response:

There are several commercially available cost of capital estimation models that rely on some form of empirical CAPM. Ibbotson Associates provide such a service which includes cost of capital estimates based on several approaches, including an empirical approach to estimating the risk-return tradeoff. They use a well-known empirical version of the CAPM known as the Fama-French CAPM, also known as the Three-Factor CAPM. Several versions of the Arbitrage Pricing Model, a multiple-factor version of the CAPM, are also made commercially available.

In terms of regulatory applications, in a mammoth generic rate of return proceeding for electric utilities, following the submission of countless testimonies filed by a myriad experts, the New York Public Service Commission endorsed the validity of the ECAPM, which they referred



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references to the relative use or non-use of various forms of CAPM in the vast majority of rate orders. A NARUC survey of ROE methodologies indicated that the vast majority of regulatory commissions rely on a variety of methodologies rather than on any specific approach.

## Ref: Page 25, lines 13-14.

In the referenced testimony, Dr. Morin cites the "use of the entire study period in estimating the appropriate market risk premium." Please explain why Dr. Morin's risk premium estimates on pages 29-30 of his testimony reflect the use of risk premiums that end in 2001.

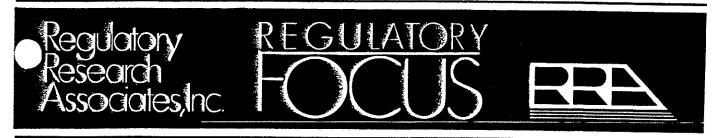
## Dr. Morin's Response:

Exhibits HECO-2002 and HECO-2003 stop in 2001 because Moody's Public Utility Manual from which the data were drawn discontinued the publication following the acquisition of Moody's by Mergent.

Please provide source document(s) of all "ROE allowed by regulatory commissions for electric utilities over the last decade" as cited on page 31 of Dr. Morin's direct testimony.

## Dr. Morin's Response:

With reference to the Allowed ROE Risk Premium Analysis of Dr. Morin's testimony, the annual allowed ROE data was taken from Regulatory Research Associates, Inc.'s ("Regulatory Focus", Major Rate Case Decisions – 1998 - 2004, June 2004) comprehensive survey of ROE decisions by regulators over the period 1987-2004 for electric utilities. A more current edition of "Regulatory Focus" is enclosed.



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Regulatory Study January 14, 2005

## MAJOR RATE CASE DECISIONS--JANUARY 2003-DECEMBER 2004 SUPPLEMENTAL STUDY

In conjunction with the preparation of the Regulatory Study entitled Major Rate Case Decisions—January 1990-December 2004, which will be distributed in the next few weeks, RRA has prepared chronological listings of all cases in that study for the years 2003 and 2004, by type of utility service. These listings, with key data concerning each case, appear on pages 7 through 12 of this Supplemental Study. Tables summarizing cases decided in the last 11 years appear on pages 2 and 3, and graphs summarizing the authorized equity returns in the last 14 years appear on pages 4 through 6. The average equity return authorized electric utilities in 2004 approximated 10.7%, down slightly from 11% in 2003. There were 19 electric equity return determinations in 2004 and 22 in 2003. The average return on equity (ROE) authorized gas utilities approximated 10.6% in 2004, down from 11% in 2003. There were 20 gas cases that included an ROE determination in 2004 and 25 in 2003. For the telecommunications industry, there was one ROE determination (10%) in 2004 and none in 2003.

Over the last several years there have been fewer equity return determinations relative to the 1980's and early 1990's. The reasons for this phenomenon include: industry restructuring/intensifying competition; more efficient utility operations; technological improvements; relatively low inflation and interest rates; accelerated depreciation/amortization programs; the increased utilization of settlements that do not specify return parameters; and, the growing use of performance or price-based regulation. As the number of equity return determinations has declined, the average authorized ROE has less of a relationship to the return that the typical electric, gas, or telecommunications company has an opportunity to earn from regulated operations. In addition, electric industry restructuring in many states has led to the unbundling of rates, with commissions authorizing revenue requirement and return parameters for transmission and/or distribution operations only (which we footnote in our chronology table), thus further complicating data comparability.

The individual electric, gas, and telecommunications cases listed on pages 7 through 12 are presented with the decision date shown first, followed by the company name, the abbreviation of the state issuing the decision, the authorized rate of return (ROR) and ROE, and the common equity component in

RRA

# Average Equity Returns Authorized January 1994 - December 2004

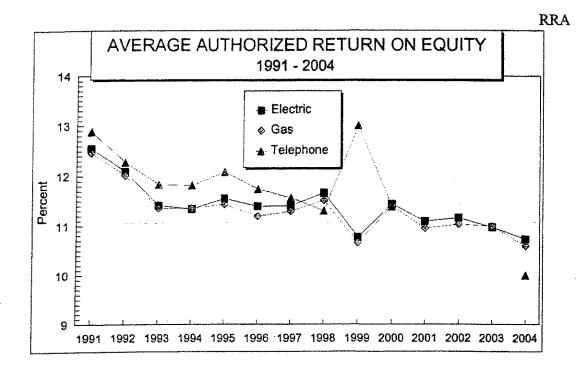
Dodad		Electric Utilities	Gas <u>Utilities</u>	Telephone <u>Utilities</u>	
1994 1995 1996	Period  Full Year  Full Year  Full Year  Full Year  Full Year	11.34 (31) 11.55 (33) 11.39 (22) 11.40 (11)	11.35 (28) 11.43 (16) 11.19 (20) 11.29 (13)	11.81 (11) 12.08 (8) 11.74 (4) 11.56 (5)	
1997 1998	1st Quarter 2nd Quarter 3rd Quarter 4th Quarter	11.31 (4) 12.20 (1) 11.80 (2) 11.83 (3)	(0) 11.37 (3) 11.41 (3) 11.69 (4)	11.30 (1) (0) (0) (0)	
1998	Full Year	11.66 (10)	11.51 (10)	11.30 (1)	
1999	1st Quarter 2nd Quarter 3rd Quarter 4th Quarter	10.58 (4) 10.94 (4) 10.63 (8) 11.08 (4)	10.82 (3) 10.82 (3) (0) 10.33 (3)	13.00 (1) (0) (0) (0)	
			40.60-403	42.00 (4)	

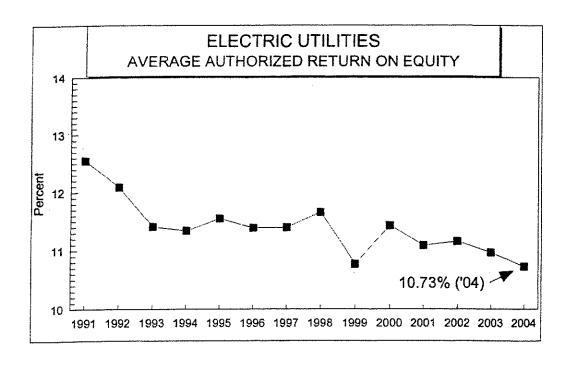
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2000	1st Quarter	11.06 (5)	. 10.71 (1)	11.50 (1)	
2000	-	11.11 (2)	11.08 (4)	(0)	
	2nd Quarter	11.68 (2)	11.33 (5)	11.25 (1)	1.0
	3rd Quarter	12.08 (3)	12.50 (2)	(0)	
	4th Quarter	12.00 (0)		<u> </u>	
0000	Full Year	11.43 (12)	11.39 (12)	11.38 (2)	
2000	Full Teal				
					and the second
2001	1st Quarter	11.38 (2)	11.16 (4)	<del>- (0)</del>	
2001	2nd Quarter	10.88 (2)	10.75 (1)	(0)	
	3rd Quarter	10.78 (8)	<b>—</b> (0)	(0)	
		11.50 (6)	10.65 (2)	<b></b> (0)	
	4th Quarter	(1)			
2001	Full Year	11.09 (18)	10.95 (7)	(0)	•
2001	Full Teat				
			<u> </u>		A forth
2002	1st Quarter	10.87 (5)	10.67 (3)	(0)	
2002	2nd Quarter	11.41 (6)	11.64 (4)	(0)	
	3rd Quarter	11.06 (4)	11.50 (3)	· (0)	£11.
	*··	11.20 (7)	10.78 (11)	— (0)	
	4th Quarter				•
2002	Full Year	11.16 (22)	11.03 (21)	(0)	
7.18.7	LDII LOGI				

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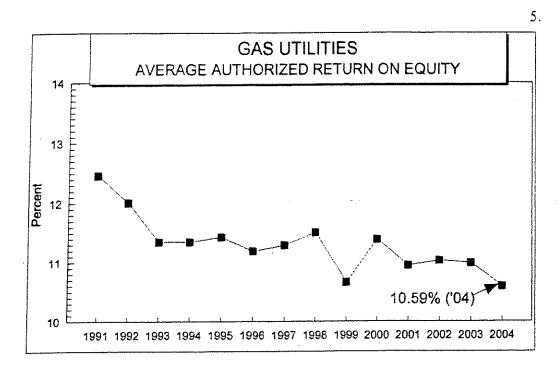
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		Elec	tric UtilitiesSummary	Table*	
		ROR	ROE	Eq. as %	Amt.
	Perlod		<u>*</u>	Cap. Struc.	S.MIL.
199		9.29 (30)	11.34 (31)	45.15 (30) 45.90 (30)	1,116.9 (40) 455.7 (43)
199		9.44 (30)	11.55 (33) 11.39 (22)	44.34 (20)	-5.6 (38)
199 199	•	9.21 (20) 9.16 (12)	11.40 (11)	48.79 (11)	-553.3 (33)
199	•	9.44 (9)	11.66 (10)	46.14 (8)	-429.3 (31)
199		8.81 (18)	10.77 (20)	45.08 (17)	-1,683.8 (30)
200		9.20 (12)	11.43 (12)	48.85 (12)	-291.4 (34)
200	•	8.93 (15)	11.09 (18)	47.20 (13)	14.2 (21)
200		8.72 (20)	11.16 (22)	46.27 (19)	-475.4 (24)
200	. ,	V (- · · )	,,	• •	, ,
2003	3 1st Quarter	9.07 (6)	11.47 (7)	49.94 (5)	48.2 (7)
2000	2nd Quarter	9.07 (4)	11.16 (4)	49.46 (4)	116.2 (5)
	3rd Quarter	8.22 (5)	9.95 (5)	46.09 (5)	-61.0 (5)
	4th Quarter	9.07 (5)	11.09 (6)	52.17 (5)	210.4 (5)
2003		8.86 (20)	10.97 (22)	49.41 (19)	313.8 (22)
2000	, ron rear	0.00 (20)	(111)		
2004	1 1st Quarter	8.94 (3)	11.00 (3)	44.94 (3)	-716.4 (4)
2004	2nd Quarter	7.88 (6)	10.50 (6)	45.59 (6)	641.4 (11)
	3rd Quarter	9.01 (2)	10.33 (2)	45.05 (2)	119.4 (4)
	4th Quarter	8.55 (7)	10.91 (8)	49.64 (6)	1,047.8 (11)
	40) Quarte:	6.55 (1)	10.51 (0)	10.07 (0)	1,011.10 (1.1)
2004	Full Year	8.44 (18)	10.73 (19)	46.84 (17)	1,092.2 (30)
		Gas	Utilitles-Summary Tabl	<u>e*</u>	
1994	Full Year	9.51 (32)	11.35 (28)	48.12 (27)	422.9 (42)
1995		9.64 (16)	11.43 (16)	49.98 (15)	-61.5 (31)
1996		9.25 (23)	11.19 (20)	47.69 (19)	193.4 (34)
1997		9.13 (13)	11.29 (13)	47.78 (11)	-82.5 (21)
1998		9.46 (10)	11.51 (10)	49.50 (10) 49.06 (9)	93.9 (20) 51.0 (14)
1999		8.86 (9) 9.33 (13)	10.66 (9) 11.39 (12)	48.59 (12)	135.9 (20)
2000 2001		8.51 (6)	10.95 (7)	43.95 (5)	114.0 (11)
2002		8.80 (20)	11.03 (21)	48.29 (18)	303.6 (26)
2003	1st Quarter	8.97 (4)	11.38 (5)	50.59 (4)	35.9 (6)
•	2nd Quarter	9.09 (3)	11.36 (4)	50.32 (3)	14.2 (5)
	3rd Quarter	8.54 (4)	10.61 (5)	45.74 (4)	89.5 (6)
	4th Quarter	8.64 (11)	10.84 (11)	51.06 (11) 49.93 (22)	120.5 (13) 260.1 (30)
2003	Full Year	8.75 (22)	10.99 (25)	45.50 (££)	200.1 (00)
2004	1st Quarter	8.52 (4)	11.10 (4)	45.61 (4)	56.3 (6)
2004	2nd Quarter	8.21 (3)	10.25 (2)	46.90 (2)	121.7 (9)
	3rd Quarter	8.27 (8)	10.37 (8)	42.92 (8)	113.4 (8)
	4th Quarter	8.40 (6)	10.66 (6)	49.72 (6)	12.1 (8)
2004	Full Year	8.34 (21)	10.59 (20)	45.90 (20)	303.5 (31)
		Telep	hone Utilitles-Summar	ry Table*	
4004	Eult Veer	9.91 (12)	11.81 (11)	57.46 (11)	-236.6 (16)
1994 1995	Full Year Full Year	9.81 (12) 9.81 (8)	12.08 (8)	55.02 (7)	-264.0 (14)
1996	Full Year	9.65 (2)	11.74 (4)	56.00 (2)	-348.2 (11)
1997	Full Year	9.57 (5)	11.56 (5)	<b>55.84 (</b> 5)	-154.4 (7)
1998	Full Year	9.37 (1)	11.30 (1)	52.00 (1)	-323.3 (13)
1999	Full Year	11.34 (1)	13.00 (1)	66.90 (1)	-570.1 (19)
2000	Full Year	9.52 (2)	11.38 (2)	56.59 (2) — (0)	-390.4 (14) -130.0 (8)
2001	Full Year Full Year	9.61 (1)	(0) (0)	- (0) - (0)	7.7 (4)
2002		(0)			
2003	1st Quarter	(0)	(0) (0)	(0) (0)	(0) -27.6 (1)
	2nd Quarter 3rd Quarter	(0) (0)	— (0) — (0)	(0)	-35.0 (1)
	4th Quarter	(0) (0)	(0)	<b></b> (0)	— (0)
2003	Full Year	<del>- (0)</del>	<del>- (0)</del>	<del> (o)</del>	-62.6 (2)
2004	1st Quarter	8.02 (1)	10.00 (1)	44.18 (1)	3.1 (1)
***	2nd Quarter	<b>—</b> (0)	<b>—</b> (0)	<del></del> (0)	(0)
	3rd Quarter	<b></b> (0)	<b>—</b> (0)	- (0)	(0)
	4th Quarter	— (0)	(0)	(0)	(0)
2004	Full Year	8.02 (1)	10.00 (1)	44.18 (1)	3.1 (1)
,					

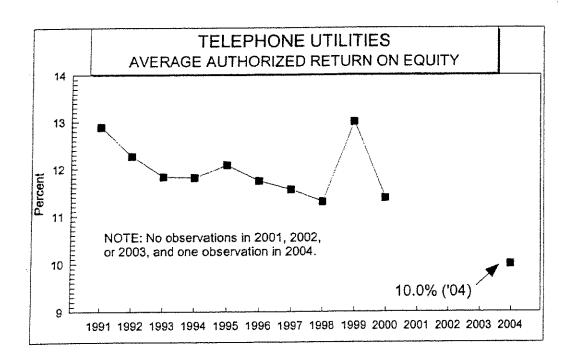






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The table on page 2 shows the average ROE authorized annually since 1994 and by quarter since 1998, in major electric, gas, and telecommunications rate decisions, followed by the number of observations in each period. The tables on page 3 show the composite electric, gas, and telecommunications industry data for all the cases included in the chronology of this and earlier reports, summarized annually since 1994 and by quarter for the past eight quarters. The graphs on pages 4 and 5 show the average authorized equity returns for the three industry groups.

The graph below tracks the average equity return authorized for all electric, gas, and telecommunications rate cases combined, by year, for the last 14 years. As the graph reveals, since 1991

### ELECTRIC UTILITY DECISIONS

Date	Company (State)	ROR	ROE	Common Eq. as % Cap. Str.	Test Year & Rate Base	Amt. \$ Mil.
1/8/03	Entergy Gulf States (LA)		11.10			-22.1 (B)
	Public Service Co. of New Mexico (NM)			<b>200</b>		-35.2 (B,Z,1)
1/31/03	South Carolina Electric & Gas (SC)	9.94	12.45	52.18	3/02-YE	70.7
2/28/03	Madison Gas and Electric (WI)	9.71 (G)	12.30	55.42	12/03-A	20.3
	PacifiCorp (WY)	8.45	10.75	45.70	9/01-YE	8.7
	Rochester Gas & Electric (NY)	8.11	9.96	° 41.40	6/03-A	-15.6 (2)
	Wisconsin Public Service (WI)	9.24 (G)	12.00	55.00	12/03-A	21.4
3/28/03	Commonwealth Edison (IL)	8.99	11.72	May reply agents	12/02-YE	(I,B,3)
2003	1ST QUARTER AVERAGES/TOTAL	9.07	11.47	49.94	-	48.2
	OBSERVATIONS	6	7	5		7
4/3/03	Wisconsin Power & Light (WI)	9.04 (G)	12.00	51.72	12/03-A	77.1
	Interstate Power & Light (IA)	9.08	11.15	47.20 (U)	12/01-A	25.8 (I,R)
5/15/03	Entergy New Orleans (LA)	-		***	annon	18.4 (B)
6/25/03	Aquila (CO)	9.07	10.75	47.50	6/02-A	16.0 (B)
6/26/03	Public Service of Colorado (CO)	9.08	10.75	51.40	12/01-A	-21.1 (B)
2003	2ND QUARTER AVERAGES/TOTAL	9.07	11.16	49.46	_	116.2
	OBSERVATIONS	4	4	4		5
	Public Service Electric & Gas (NJ)	8.18	9.75	41.45	12/02-YE	159.5 (B,Di)
7/16/03	Rockland Electric (NJ)	8.02	9.75	46.00	4/03-YE	-7.2 (Di)
	Jersey Central Power & Light (NJ)	8.38	9.50	46.00	12/02-YE	-222.7 (Di)
8/26/03	PacifiCorp (OR)	8.28	10.50	46.00	3/04-A	8.5 (B)
9/3/03	Maine Public Service (ME)	8.25	10.25	51.00	12/02-A	0.9 (B,4)
2003	3RD QUARTER AVERAGES/TOTAL	8.22	9.95	46.09	-	-61.0
	OBSERVATIONS	5	5	5		5
12/17/03	Connecticut Light & Power (CT)	8.19	9.85	47.22	12/02-YE	70.5 (Z,TD)
	PacifiCorp (UT)	8.43	10.70	47.04	3/03-A	65.0 (B)
	Montana-Dakota Utilities (ND)	10.02	11.50	50.32	12/03-A	1.0 (B)
	Wisconsin Power & Light (WI)	9.50 (G)	12.00	60.27	12/04-A	14.5
	Wisconsin Public Service (WI)	9.20 (G)	12.00	56.00	12/04-A	59.4
	Green Mountain Power (VT)	***	10.50	***	****	— (B,5)
2003	4TH QUARTER AVERAGES/TOTAL	9.07	11.09	52.17	-	210.4
	OBSERVATIONS	5	6	5		5
2003	FULL-YEAR AVERAGES/TOTAL	8.86	10.97	49.41		313.8
	OBSERVATIONS	. 20	22	19		22

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# ELECTRIC UTILITY DECISIONS (continued)

Date	Company (State)	ROR	ROE	Common Eq. as % Cap. Str.	Test Year & Rate Base	Amt. \$ Mil.
1/13/04	Madison Gas and Electric (WI)	9.37 (G)	12.00	55.91	12/04-A	11.7
	Pacific Gas and Electric (CA)			***		-799.0 (B)
3/2/04	PacifiCorp (WY) Nevada Power (NV)	8.42 9.03	10.75 10.25	44.95 33.97	9/02-YE 5/03-YE	22.9 48.0
2004	1ST QUARTER AVERAGES/TOTAL OBSERVATIONS	8.94 3	11.00 3	44.94	<u>.</u>	-716.4 4
4/13/04	Interstate Power and Light (MN) Aquila-MPS (MO) Aquila-L&P (MO)	9.05  	11.00 	47.15  	12/02-A 	0.2 (I) 14.5 (B) 3.3 (B)
5/5/04 5/18/04 5/20/04 5/25/04	Wisconsin Electric Power (WI) PSI Energy (IN) Rochester Gas & Electric (NY) Idaho Power (ID) Sierra Pacific Power (NV)	7.30  7.85 9.26	10.50  10.25 10.25	44.44 *  45.97 35.77	12/04-A 9/02-YE 4/05-A 12/03-A 7/03-YE	59.0 107.3 7.4 (B,6) 39.5 (R,B,Z) 46.7 (B)
6/2/04 6/30/04	Pacific Gas & Electric (CA) Kentucky Utilities (KY) Louisville Gas and Electric (KY)	7.00 (G) 6.79 (G)	10.50 10.50	51.58 48.60	12/03-A 9/03-YE 9/03-YE	274.0 (B) 46.1 (B,7) 43.4 (B,8)
2004	2ND QUARTER AVERAGES/TOTAL OBSERVATIONS	7.88 6	10.50 6	45.59 6		641.4 11
7/16/04	Southern California Edison (CA)				12/03-A	73.0
8/25/04	Aquila (CO)	8.76	10.25	47.50	8/03-A	8.2 (B)
9/2/04 9/9/04	Public Service New Hampshire (NH) Avista Corp. (ID)	9.25	10.40	42.59	12/02-A	13.5 (B,Z,TD) 24.7
2004	3RD QUARTER AVERAGES/TOTAL OBSERVATIONS	9.01	10.33 2	45.05 2		119.4 4
10/27/04	PacifiCorp (WA)	8.39				15.0 (B)
11/23/04	Narragansett Electric (RI) Cincinnati Gas & Electric (OH) Detroit Edison (MI)	8.89 (E)  7.24	10.50  11.00	50.00  38.08 *	  12/02-A	-10.2 (B,Di) 85.0 (R,Z) 373.7 (I)
12/14/04	San Diego Gas & Electric (CA) Interstate Power & Light (IA) Georgia Power (GA) Wisconsin Public Service (WI)	8.83 8.89 (G)	10.97 11.25 11.50	47.89 57.35	12/04-A 12/03-A 12/05-A 12/05-A	-8.2 (B,Di) 106.7 (I,B) 194.1 (B) 61.0

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GAS UTILITY DECISIONS								
Date	Company (State)	ROR	ROE _%_	Common Eq. as % Cap. Str.	Test Year & Rate Base	Amt. <u>\$ Mil.</u>		
1/6/03	Peoples Gas System (FL)	8.83	11.25	50.92 *	12/03-A	12.1 (I,B		
	Aquila (IA) Madison Gas and Electric (WI)	9.71 (G)	12.30	55.42	12/01-A 12/03-A	4.3 (I,B 6.8		
3/12/03	Rochester Gas & Electric (NY) 3. Aquila Networks-MGU (MI) 5. Wisconsin Public Service (WI)	8.11  9.24 (G)	9.96 11.40 12.00	41.40  55.00	6/03-A 12/03 12/03-A	5.5 8.4 (I,B -1.2		
2003	1ST QUARTER AVERAGES/TOTAL OBSERVATIONS	8.97 4	11.38 5	50.69 4	48tud	35.9 6		
4/3/03	Wisconsin Power & Light (WI)	9.04 (G)	12.00	51.72	12/03-A	3.6		
5/2/03 5/15/03 5/15/03	SEMCO Energy Gas (MI) Entergy New Orleans (LA) Interstate Power and Light (IA)	 9.03	11.40  11.05	  47.84 (U)	12/03  12/01-A	3.3 (B) 11.8 (B) 13.3 (I)		
	Public Service of Colorado (CO)	9.20	11.00	51.40	12/01-A	-17.8 (B)		
2003	2ND QUARTER AVERAGES/TOTAL OBSERVATIONS	9. <b>0</b> 9 3	11.36 4	50.32 3		14.2 5		
7/1/03 7/29/03	Citizens Utilities (AZ) Peoples Natural Gas (MN)	9.93	11.00 11.71	49.99	12/01-YE 12/00-A	15.2 (B) 5.0 (I,B)		
8/22/03	Northwest Natural Gas (OR)	8.62	10.20	49.50	9/04-A	13.9 (B,Z		
	Arkansas Western Gas (AR)	6.74	9.90	35.20 *	6/02-YE	4.1 (B) 45.0 (B)		
	ONEOK (KS) Avista Corp. (OR)	8.88	10.25	48.25	12/02-A	6.3 (B)		
2003	3RD QUARTER AVERAGES/TOTAL	8.54	10.61	45.74	<u></u>	89.5		
	OBSERVATIONS	4	5	4		6		
	AmerenCILCO (IL)	8.16	10.54	48.54	12/01-YE 10/04-A	9.1 23.6 (B,Z		
	Orange & Rockland Utilities (NY)	8.33	10.71	 44.44	6/02-YE	7.2		
	AmerenCIPS (IL) AmerenUE (IL)	8.24	10.46	52.70	6/02-YE	1.9		
	North Carolina Natural Gas (NC)	9.27	11.00	51.14	9/02-YE	21.0 (B)		
	Boston Gas (MA)	9.08	10.20	50.00	12/02-YE	19.7		
	Washington Gas (MD)	8.61	10.75	51.49	12/02-YE	2.9		
1/10/03	Washington Gas (DC)	8.42	10.60	50.30	9/02-YE	5.4		
	Delmarva Power & Light (DE)	7.81	10.50	45.87	9/02	7.8 (I,B)		
	Washington Gas (VA)	8.44	10.50	50.96	12/01-YE	9.9 (I)		
	Wisconsin Power & Light (WI)	9.50 (G) 9.20 (G)	12.00 12.00	60.27 56.00	12/04-A 12/04-A	-0.4 8.9		
	Wisconsin Public Service (WI) National Fuel Gas Distribution (PA)	9.20 (G) —			9/03-YE	3.5 (B)		
2003	4TH QUARTER AVERAGES/TOTAL	8.64	10.84	51.06		120.5		
	OBSERVATIONS	11	11	11		13		
	FULL-YEAR AVERAGES/TOTAL OBSERVATIONS	8.75 22	10.99 25	49.93 22		260.1 30		

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# GAS UTILITY DECISIONS (continued)

	GAS OTTE	ITT DECISIO	10011111			
Date	Company (State)	ROR	ROE	Common Eq. as % Cap. Str.	Test Year & Rate Base	Amt. <u>\$ Mil.</u>
1/13/04	Union Electric (MO)  Madison Gas and Electric (WI)	 9.37 (G)		55.91	 12/04-A	13.0 (B) 1.0
1/13/04	Public Service Co. of New Mexico (NM) Aquila (NE)	8.16 	10.25	47.77 	9/02-YE 	22.0 (B,Z) 6.2 (I,B)
2/9/04	City Gas Co. of Florida (FL)	7.36	11.25	36.77 *	9/04-A	6.7 (I)
3/16/04	Southwest Gas (CA)	9.17	10.90	42.00	12/03-A	7.4 (9)
2004	1ST QUARTER AVERAGES/TOTAL - OBSERVATIONS	8.52 4	11.10 4	45.61 4	<del></del>	56.3 6
4/22/04 4/22/04	Aquila Networks-MPS (MO) Aquila Networks-L&P (MO)	des services	MI SOM	% 40-40-		2.6 (B) 0.8 (B)
5/5/04	Wisconsin Gas (WI)		<u></u> ·		12/04-A 4/05-A	26.0 (i) 7.2 (B,6)
	Rochester Gas & Electric (NY) TXU-Gas (TX)	8.26	10.00	49.80	12/02-YE	12.0
6/2/04	Pacific Gas & Electric (CA) Northwest Natural Gas (WA)	 8.95		45-11-4 <u>4</u>	12/03-A	52.0 (B) 3.5 (B)
6/30/04	Southern Indiana Gas and Electric (IN) Louisville Gas and Electric (KY)	7.41	10.50 (B) 	44.00 *	9/03-YE 9/03-YE	5.7 (B) 11.9 (B)
2004	2ND QUARTER AVERAGES/TOTAL OBSERVATIONS	8.21 3	10.25 2	46.90 2	_	121.7 9
7/8/04 7/22/04	South Jersey Gas (NJ) CenterPoint Energy Arkia (LA)	7.97 8.09	10.00 10.25	46.00 45.80 (Hy)	2/04-YE 6/03-A	20.0 (B) 7.1 (B)
8/26/04 8/26/04	Southwest Gas, Southern Division (NV) Southwest Gas, Northern Division (NV)	7.45 8.56	10.50 10.50	40.00 40.00	9/03-YE 9/03-YE	7.3 6.4
9/9/04	Avista Corp. (ID)	9.25	10.40 10.50	42.59 29.99	12/02-A 6/03-YE	3.3 22.5
9/21/04 9/27/04	Missouri Gas Energy (MO) Consolidated Edison of New York (NY)	8.36 8.06	10.30	48.00	9/05-A	46.8 (B)
	Washington Gas (VA)	8.44	10.50	50.96	6/03-YE	0.0 (B)
2004	3RD QUARTER AVERAGES/TOTAL OBSERVATIONS	8.27 8	10.37 8	42.92 8		113.4 8
10/20/04	Chattanooga Gas (TN)	7.43	10.20	35.50	9/03-A	0.6
11/30/04	Indiana Gas (IN)	8.38	10.60	50.06	9/03-YE	24.0 (B)
	San Diego Gas & Electric (CA)	<del></del>			12/04-A 12/04-A	1.6 (B,Di) -33.0 (B,Di)
	Southern California Gas (CA) Yankee Gas Services (CT)	7.99	9.90	47.90		14.0 (B)
	Wisconsin Public Service (WI)	8.89 (G)	11.50	57.35	12/05-A	5.6
	Madison Gas and Electric (WI)	9.18 (G)	11.50	57.64	12/05-A	-4.2
	CenterPoint Energy Arkla (OK)	8.51	10.25	49.86	3/04-YE	3.5 (B)
2004	4TH QUARTER AVERAGES/TOTAL OBSERVATIONS	8.40 6	10.66 6	49.72 6	·	12.1 8
2004	FULL-YEAR AVERAGES/TOTAL OBSERVATIONS	8.34 21	10.59 20	45.90 20		303.5 31

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Date	Company (State)	ROR	ROE 	Common Eq. as % Cap. Str.	Test Year & Rate Base	Amt. <u>\$ Mil.</u>
2003	1ST QUARTER TOTAL OBSERVATIONS	0	0	 0		0
5/21/03	Verizon North/Verizon South (IL)		***	****		-27.6 (B,Z)
2003	2ND QUARTER TOTAL			100 Najarah	-	-27.6
	OBSERVATIONS	0	0	0		1
8/12/03	Verizon Northwest (WA)			<del></del>		-35.0
2003	3RD QUARTER TOTAL				•	-35.0
2000	OBSERVATIONS	0	0	0		1
2003	4TH QUARTER TOTAL OBSERVATIONS	 0	0			0
2000	FULL-YEAR TOTAL					-62.6
2003	OBSERVATIONS	0	0	0		2
1/29/04	CenturyTel of North West Arkansas (AR)	8.02	10.00	44.18 *	6/02-YE	3.1 (B)
g	ART OUADTED AVEDAGES/TOTAL	я ∩э	10.00	44.18	•	3.1

2004	FULL-YEAR AVERAGES/TOTAL	8.02	10.00	44.18	3.1
2004	4TH QUARTER AVERAGES/TOTAL OBSERVATIONS	0	0	0	0
2004	3RD QUARTER AVERAGES/TOTAL OBSERVATIONS		0	0	0
2004	2ND QUARTER AVERAGES/TOTAL OBSERVATIONS	 0	0	0	0

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### **FOOTNOTES**

- A- Average
- B- Order followed stipulation or settlement by the parties. Decision particulars not necessarily

proceedant-cotting or specifically adopted by the regulatory body.

G- Return on capital

Hy- Hypothetical

Interim rates implemented prior to the issuance of final order, normally under bond and subject to refund. -

- TD- Rate change applicable to transmission and distribution rates only.
- U- Double leveraged capital structure utilized.

YE- Year-end

- Z- Rate change implemented in multiple steps.
  - Capital structure includes cost-free items or tax credit balances at the overall rate of return.
- (1) Rates to be reduced \$21.7 million effective September 1, 2003 and an additional \$13.5 million on September 1, 2005.
- (2) Electric revenue requirement reduction. PSC changed an accounting amortization schedule to allow electric rates to remain unchanged.
- Return parameters established in proceeding to set delivery services tarrifs, which apply only to customers who select an alternative supplier of generation service.
- Rate changes include distribution rates and various restructuring related rate changes.

### CA-IR-117

### **Ref:** Page 34, lines 8-16.

The referenced testimony discusses the assumptions of DCF model. Please indicate Dr. Morin's assessment of the assumptions of the CAPM, empirical CAPM, and risk premium models.

### Dr. Morin's Response:

The realism of the DCF assumptions is discussed fully in Chapter 9 of Dr. Morin's book, Regulatory Finance, Public Utility Reports Inc., Arlington, Va., 1994. The assumptions underlying the CAPM are discussed in Chapters 12 and 15 of the same book.

The crucial assumptions of the general DCF model are:

- That investors, in fact, evaluate common stocks in the classical valuation framework, and trade securities rationally at prices reflecting their perceptions of value.
- 2. That investors discount the expected cash flows at the same rate of return (K) in every future period. In other words, a flat yield curve is assumed.
- 3. That the K obtained from the fundamental DCF equation corresponds to that specific stream of future cash flows alone, and no other. There may be alternate company policies that would generate the same future cash flows, but these policies may alter the risk of the cash flow stream, and hence modify the investor's required return, K.

The assumptions of the standard constant growth DCF model are as follows:

Assumption #1. The 3 assumptions discussed in conjunction with the general DCF model still remain in force.

Assumption #2. The discount rate, K, must exceed the growth rate, g. In other words, the standard DCF model does not apply to growth stocks.

Assumption #3. The same growth rate applies to dividend, earnings, and book value, and is constant in every year to infinity.

Some of these assumptions can be quite unrealistic in a given capital market environment. For example, the standard constant growth DCF model assumes a constant market valuation multiple, that is, a constant price/earnings (P/E) ratio. In other words, the model assumes that investors expect the ratio of market price to dividends (or earnings) in any given year to be the same as the current price/dividend (or earnings) ratio. This is unrealistic under current conditions. The inability of the standard DCF model to account for changes in relative market valuation and the questionable applicability of the model when M/B ratios deviate substantially from 1.00 are additional vivid examples of the potential shortcomings of the DCF model. The DCF model is simply not equipped to deal with sudden surges in M/B and P/E ratios, as was experienced by several utility stocks in recent years.

If we view the CAPM as a special case of the Arbitrage Pricing Model (APM) where the market portfolio is the only factor affecting security prices, it is clear that the assumptions underlying the APM are far less stringent than the assumptions required for the DCF model to obtain. The APM derives from two major assumptions: that security returns are linear functions of several economic factors, and that no profitable arbitrage opportunities exist since investors are able to eliminate such opportunities through riskless arbitrage transactions. The other assumptions required by the APM are that investors are greedy and risk averse, that they can diversify company-specific risks by holding large portfolios, and that enough investors possess similar expectations to trigger the arbitrage process.

CA-IR-118

### **Ref: Page 38, lines 14-25.**

The referenced testimony discusses the "abundance of evidence attesting to the important of earnings in assessing investors' expectations." Please identify any evidence that Dr. Morin is aware of that implies investors rely exclusively on earnings forecasts in making investment decisions.

### Dr. Morin's Response:

Dr. Morin is not suggesting that investors rely exclusively on earnings forecasts in making investment decisions. Dr. Morin was suggesting that as a proxy for the expected growth ("g") term in the DCF model, projected earnings growth is a more reliable proxy than projected dividend growth. As a practical matter, there are very few available dividend forecasts in contrast to the myriad earnings forecasts available on numerous Web sites and publications. Moreover, the finance literature has demonstrated the superiority of analysts growth forecasts as proxies for expected growth in the DCF model.

Extensive academic researches in the past two decades have documented and confirmed repeatedly the overwhelming superiority of analysts' earnings forecasts over the univariate timeseries forecasts<sup>1</sup>. This latter category includes many *ad hoc* forecasts from statistical models, ranging from the naive methods of simple averages, moving averages, etc. to the sophisticated time-series techniques such as the Box-Jenkins modeling techniques.

<sup>1 1.</sup> Empirical studies that conclude that investment analysts' growth forecasts serve as a better surrogate for investors expectations than historic growth rates include Lawrence D. Brown and Michael S. Rozeff, "The Superiority of Analyst Forecasts as Measures of Expectations: Evidence from Earnings", The Journal of Finance, Vol. XXXIII, No. 1, March 1978; Dov Fried and Dan Givoly, "Financial Analysts Forecasts of Earnings, A Better Surrogate for Market Expectations", Journal of Accounting and Economics, Vol. 4 (1982); R. Charles Moyer, Robert E. Chatfield, Gary D. Kelley, "The Accuracy of Long-Term Earnings Forecasts in the Electric Utility Industry", International Journal of Forecasting Vol. I (1985); Robert S. Harris, "Using Analysts' Growth Forecasts to Estimate Shareholder Required Rates of Return", Financial Management, Spring 1986, and, James H. Vander Weide and William T. Carleton, "Investor Growth Expectations: Analysts vs. History", The Journal of Portfolio Management, Spring 1998.

In other words, this literature suggests that analysts' earnings forecasts incorporate all the public information available to the analysts and the public at the time the forecasts are released. Furthermore, these forecasts are statistically more accurate than forecasts solely based on historical earnings, dividends, book value equity, and the like.

This finding is based on researches on data from 1950s to 1980s. Important papers include Brown and Rozeff (1978), Cragg and Malkiel (1982), Harris (1986), Vander Weide and Carleton (1988), and Lys and Sohn (1990).

More recent studies provide evidence that analysts make biased forecasts and misinterpret the impact of new information. For example, several studies in the early 1990s suggest that analysts either systematically under-react or over-react to new information. Easterwood and Nutt (1999) discriminate between these different reactions and reported that analysts under-react to negative information, but over-react to positive information.

However, it should be pointed out that these new studies do not necessarily contradict the earlier literature upon which finding 1 is based. As a matter of fact, the earlier researches focused on whether analysts' earnings forecasts are better at forecasting future earnings than historical averages are, whereas the recent literature investigates whether the analysts' earnings forecasts are unbiased estimates of future earnings. It is possible that even though the analysts' forecasts are "biased," they are still closer to the future earnings than the historical averages are, although this hypothesis has not been tested in the recent studies.

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expectations. In an extensive NBER study using analysts' earnings forecasts,

Cragg and Malkiel conclude "the expectations formed by Wall Street

professionals get quickly and thoroughly impounded into the prices of securities.

Implicitly, we have found that the evaluations of companies that analysts make are the sorts of ones on which market valuation is based." (p.59, footnote omitted)

James H. Vander Weide and Willard T. Carleton, 1988, Investor Growth Expectations: Analysts vs. History, The Journal of Portfolio Management, Spring 1988, pp. 78 - 82

This paper updated the study by Cragg and Malkiel (1982), which suggests that the stock valuation process embodies analysts' forecasts rather than historically based growth figures such as the ten-year historical growth in dividends per share or the five-year growth in book value per share. (The Cragg and Malkiel study is based on data for the 1960s).

In this paper, the authors used data from 1971- 1983 for approximately sixty-five utility firms. They "found overwhelming evidence that the consensus analysts' forecasts of future growth is superior to historically oriented growth measures in predicting the firm's stock price." Their results "also are consistent with the hypothesis that investors use analysts' forecasts, rather than historically oriented growth calculations, in making stock buy-and-sell decisions." (p. 81)

Thomas Lys and Sungkyu Sohn, 1990, The Association between Revisions of Financial Analysts' Earnings Forecasts and Security-Price Changes, Journal of Accounting and

closely preceded by earnings forecast made by other analysts or by corporate accounting disclosures.

John C. Easterwood and Stacey R. Nutt, 1999, Inefficiency in Analysts' Earnings Forecasts: Systematic Misreaction or Systematic Optimism? *Journal of Finance*, Vol. LIV, No. 5, pp. 1777 - 1797

Using actual and IBES data from 1982 - 1995, the authors regressed the analysts' forecast errors against either historical earnings changes or analysts' forecasting errors in the prior years. Their results show that analysts tend to under-react to negative earnings information, but over-react to positive earnings information.

### CA-IR-119

### Ref: Page 50, lines 1-13.

Dr. Morin states that HECO is more risky than the average electric utility. Please indicate if Dr. Morin has considered the cost of debt of HECO and the "average electric utility" in reaching this conclusion.

# Dr. Morin's Response:

Dr. Morin did not consider the cost of debt of HECO and the average electric utility in reaching his conclusion.

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CA-IR-120

Please provide a copy of the May 8, 2003 Standard & Poor's Global Sector Review cited on page 60, lines 4-8 of Dr. Morin's direct testimony.

Dr. Morin's Response:

Enclosed.

# Power Companies

# Rating methodology for global, power companies

Standard & Poor's rating methodology for global power companies incorporates two basic components: business profile (qualitative analysis) and financial profile (quantitative analysis). The two components are inextricable. A utility with a strong business profile, for example, could have less financial protection than one with a weaker business profile and still achieve the same rating. Conversely, a utility with a weak business profile would require a more robust financial profile than one with a stronger business profile in order to get the same rating. This basic concept is illustrated by the matrix in table 1.

### Business profile

Standard & Poor's utilizes business profile assessments to measure a power company's qualitative credit fundamentals. Business profiles are expressed numerically on a scale of 1 (strong) to 10 (weak). To determine a business profile, Standard & Poor's analyzes the key qualitative business or operating characteristics:

- · Regulation,
- Markets,
- Operations,
- · Competitiveness, and
- Management.

# Identifying utility types

The weighting or analytical emphasis that each business profile factor receives is strongly influenced by the type of utility. Standard & Poor's has identified four types of utilities (see table 2). The type is determined through analysis of the influence of government ownership (if any), the degree of financial stability derived from the structure of the industry, and the relative competitiveness of the system. There are both investor-owned and government-owned utilities found in all four types, and more than one type may exist within the same country.

# Table 1 Global Utility Rating Matrix

Α

Weak

Profile	, 101	isiness Profi	ie _	,
	Strong	Average	Weak	
Strong	AAA	AA	Α	
Average	ĀΑ	Α	888	_~z_

888

Type I utilities (supported) operate within systems where the utility receives overwhelming government and regulatory support. This support can be explicit, as in cases where a government guarantees a utility's obligations, such as in Canada. Or it can take the form of strong and obvious implicit support, such as in Greece. The government may facilitate the utility's access to external sources of capital, especially where the utility is a direct instrument of government policy. Type I utilities need not be completely owned by government, but government ownership is usually present. Before attributing support from government, Standard & Poor's reviews the track record of assistance, the procedures and timeliness of support mechanisms, the government's policy objectives for utility ownership, and financial policies. Standard & Poor's looks for evidence that the government would stand behind a debtor in time of financial need. Written and oral statements consistently made and significant supportive actions taken over time build credibility. In addition, Standard & Poor's considers the incentives for the government to provide tangible support. Questions asked include: What would be lost if a payment were missed? Would the borrower be able to continue to operate if it defaulted on a debt? Is the name of the borrower closely tied to the government in the marker's perception, so that a default by the borrower would cause the government difficulties in the capital markets? What are the political realities?

#### ■ STANDARD & POOR'S

Type II utilities (sheltered) conduct business where the utility is sheltered from competition and financial variability by the government or regulator. Sheltered utilities are not necessarily owned by government. Japanese investor-owned utilities offer an example. These vertically integrated utilities have historically been insulated from competition and protected by a very cooperative, coordinated rate-setting process. While generally highly leveraged, these utilities' financial results are quite stable.

Finally, Type IV utilities (commodity) ar essentially unregulated as to revenue or return Unregulated generators, such as in Argentin: and Chile, owe their success or failure to their ability to operate well at low cost, as they are subject to the sometimes harsh realities of supply and demand.

For Type I utilities, ratings will reflect the credit quality of the entity providing explicit or strong implicit support. For Type II utilities, the business profile factors of completion and

### Financial Ratio Guidelines

,	Funds from operations interest coverage (x)		Funds from operations to total debt (%)		Total debt to total capital (%)	
	A	888	Α	888	Α	888
Transmission and distributio	n 3.25	2.0	15	10	55	65
Generators	6.75	4.25	42-	<u>2</u> 7	35	45
Vertically integrated cos.	4.25	2.75	27	18	45	56

Note: Financial ratio medians are derived from Standard & Poor's financial projections for companies rated both publicly and confidentially.

The relative importance of each reflects their contributions of cash flow and operating income and the amount of capital invested. In addition, credit is given for the benefits of integration. For example, a company owning integrated generation and distribution operations benefits from the natural hedge that integration creates for both businesses. Integrated utilities tend to have business profiles in the 3-7 range.

Because of the importance of the different analytical emphasis accorded to the five business profile factors as influenced by the type of utility, the overall business profile assessment can diverge from the general expectations stated above. For example, certain generators can have strong regulatory support, and would therefore be characterized as Type II utilities. Consequently, their business profile assessment could be 3-4, reflecting heavy weighting of the supportive regulatory structure.

# Financial profiles

Standard & Poor's measures financial strength by a utility's ability to generate consistent cash flow to service its debt, finance its operations, and fund its investment. Standard & Poor's focuses on a utility's financial results for the last five years and on pro forma, five-year projections.

Because of distortions caused by vastly differing asset valuation practices and depreciation policies around the world, certain leverage and earnings ratios are not particularly useful when conducting comparative analysis. As a consequence, the proper analytical focus should be on "real" stocks and flows, namely, levels of debt, cash, and cash flow. Financial parameters that are increasingly viewed as relevant and reliable are coverage of fixed financial charges by cash flow and cash flow from operations to total debt. Less comparable measures, such as shareholders' equity, leverage, and reported earnings, are also reviewed, but deemphasized.

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Tightly regulated transmission and distribution utilities generally face limited business risk and can operate with relatively low operating margins and high leverage. Conversely, generating companies operating in a very competitive environment face much higher business risk and attendant cash flow volatility, and therefore generally can sustain only modest levels of debt. The table above displays guidelines for certain key financial ratios for rated transmission and distribution companies, generators, and vertically integrated utilities. Because of the different types of utilities—supported, sheltered, exposed, commodity-financial ratios for any particular entity may differ significantly from the guidelines. However, the ratios in the table are useful in demonstrating the typical differences in financial standards appropriate due to broad differences in business risk.

Profitability. Profit potential is a critical determinant of credit protection for investorowned utilities. A company that generates higher profits has a greater ability to generate equity capital internally, attract capital externally, and withstand business adversity. Earnings power ultimately attests to the value of the firm's assets. Profit is less significant for non-U.S. government-owned utilities, but still relevant because higher operating margins provide additional bondholder protection on a stand-alone basis. For U.S. municipal utilities, Standard & Poor's does not measure "profit" per se, but rather looks at financial health as measured by excess margins on a cash flow basis and their ability to provide coverage of revenue bonds and off-balance-sheet obligations, as measured through fixed-charge coverage.

The more important measures of profitability are:

- · Return on average equity,
- Pretax return on capital, and
- · Operating margins.

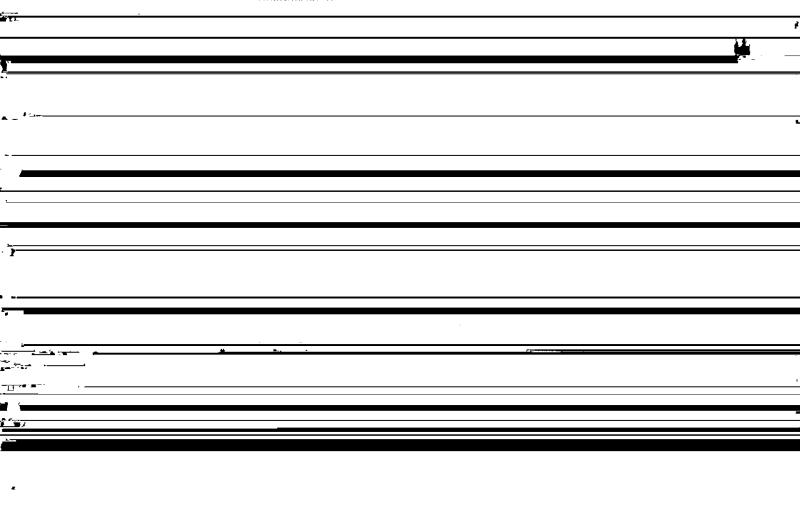
### ■ STANDARD & POOR'S

Earnings are also viewed in relation to a company's burden of fixed charges. Otherwise-strong performance can be affected detrimentally by aggressive debt financing, and the opposite also is true. The primary fixed-charge coverage ratio is EBIT interest coverage (pretax income plus interest divided by interest). If preferred stock is outstanding, coverage ratios are calculated both including and excluding preferred dividends, to reflect the company's discretion over paying the dividend when under stress.

To reflect more accurately the ongoing earnings power of the firm, reported profit figures are adjusted. These adjustments remove the effect of foreign-exchange gains and losses, writedowns, and other nonrecurring or extraordinary gains and losses. Unremitted equity earnings of a subsidiary are also excluded.

such excess liquidity, interest income may be offser against interest expense in looking a overall financial expenses. Each situation is evaluated on a case-by-case basis, in light of a company's liquidity position, normal working cash needs, nature of short-term borrowings, and funding philosophy.

Capital structure. The principal capital structure ratio analyzed is total debt to total debt plus equity. However, analyzing debt leverage goes beyond the balance sheet and covers quasi-debt items and elements of hidden financial leverage. Noncapitalized leases, debt guarantees, receivables financing, and purchased-power contracts are all considered debt equivalents and are reflected as debt in calculating capital structure ratios. Moreover, adjustments are made to reflect unfunded pension liabilities.



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Knowing the true values to assign to a company's assets is important to capital structure analysis. Consequently, assets are examined to identify undervalued or overvalued items. Asset valuation practices differ from country to country, resulting in differences in both a company's reported equity base and its depreciation

ity's skill in managing construction projects and completing any new facilities on schedule and within cost estimates. Accordingly, Standard & Poor's reviews capital priorities for the next five years and beyond.

Financial flexibility. Financial flexibility incorporates a utility's financing needs, plans,

### STANDARD & POOR'S

file assessments of 1-4. However, few companies receive the top score and some do fall below a 4.

When evaluating electric transmission and distribution companies, Standard & Poor's is most concerned about the predictability and sustainability of financial performance. For typical transmission and distribution companies, regulation, markets, and management are more important factors than operations and competitiveness, although the relative emphasis on the factors may differ depending on the type of system. Regardless of type, the regulatory environment will have great impact. Variations in policies and practices among local and national regulatory bodies are key considerations. Markets and customer composition are also important factors, with weak economic performance and a large industrial sector being less favorable. Importantly, Standard & Poor's evaluates management, especially its leadership qualities and its response to industry changes.

Regulation. Regulation defines the environment in which a utility operates, and has great influence on the company's financial performance. A utility with a marginal financial profile can, at the same time, be considered highly creditworthy due to a supportive regulatory environment. Conversely, unpredictable or antagonistic regulatory action can undermine the financial position of utilities that are very strong from an operational standpoint. To be viewed positively, regulatory treatment should be timely and allow consistent performance from period to period, given the importance of financial stability as a rating consideration. Also important is the transparency of regulatory polices and the length of time that the regulatory framework has been in place. Clearly, there is concern that the mechanics of a recently privarized system could be revisited for fine tuning. Because of this, Standard & Poor's also examines the relative ease with which regulation can be changed. That is, a transparent system that requires legislative action to modify is viewed more favorably than one more subject to the whim of ministerial discretion, as in some Asian countries. Also key is the selection process for membership of a regulatory body.

Evaluation of regulation encompasses the administrative, judicial, and legislative processes involved in local or national regulation, These ican affect rate-setting activities

competitive entry, environmental and safety rules, facility siting, and securities sales. In addition, the terms of a utility's license or franchise often impose obligations to serve any customer and provide a reasonable standard of service, and a variety of other stipulations. Ratings factor in the impact of such constraints and obligations on a utility's operations and financial performance.

Transmission and distribution companies are expected to remain tightly regulated monopolies, with rates set on a cost-plus basis in many circumstances. Under a cost-plus regime, rates are set to recover costs and, for investor-owned utilities, a return on shareholder investment. Under cost-based rates, Standard & Poor's analysis focuses on the predictability of costs and revenues. While a utility may be largely protected from business risk under cost-based rates, the responsiveness of the rate-setting process to changes in a utility's cost structure or to discrepancies between allowed and actual revenues influences the business pressures on the company.

One drawback to cost-based ratemaking is the lack of strong incentive for utilities to control costs. Since rates and earnings are closely linked to the amount of invested capital and the cost of capital, utilities may be rewarded more for justifying costs than for containing them. Consequently, Standard & Poor's believes that performance-based ratemaking will become an increasingly popular form of ratemaking, particularly for the distribution business. Because financial results can vary depending on a company's ability to meet performance challenges, performance-based systems are inherently more risky than cost-based systems. Flexible plans incorporating performance-based rewards or penalties could include market-based rates, price caps, revenue caps, index-based prices or other yardstick measures, and rates premised on the value of customer service.

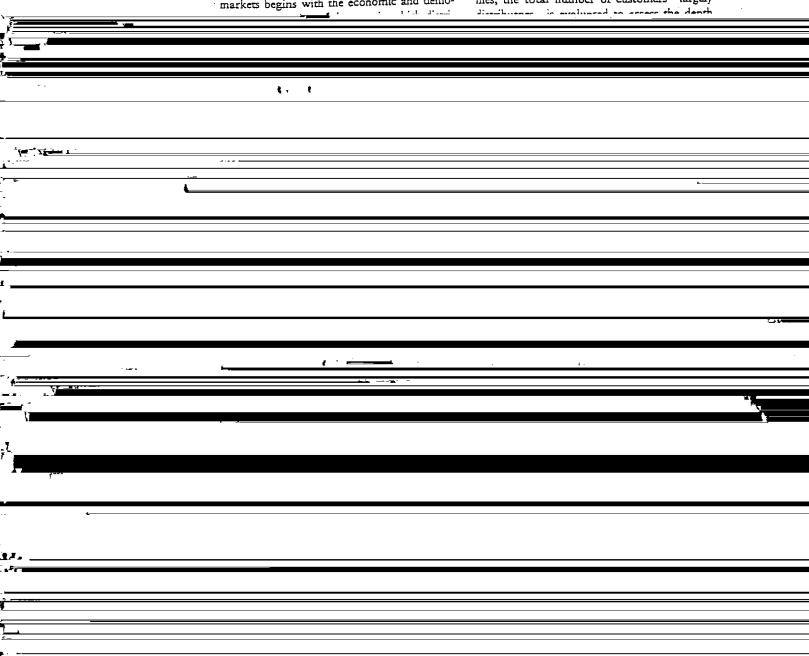
Markets. Many distribution companies are common carriers. That is, they carry electricity being purchased by customers from independent suppliers, either generating companies or marketers. Other distributors participate in the energy marketing (supply) business by buying brokering, or generating electricity through an affiliate, and selling the power to a customer. Risks in the marketing business include the significant challenge of matching fuel and power supply with demand. Whether a utility

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is involved in the sale or brokering of electricity or merely distributes the commodity, prospects for the stable growth of revenues and cash flow are ultimately related to the strength of the local economy. Customer growth is important for distributors. And, even for utilities involved only in distribution and not in energy marketing, electricity consumption is important—because the typical distributor recovers some portion of its distribution costs through a volumetric, per kWh charge, in addition to any fixed monthly or quarterly customer charge that may be in place. Accordingly, assessing a distributor's markets begins with the economic and demonstrated.

dential component produces a stable and more predictable revenue stream. The utility's largest customers are identified to determine their stability and relevance to the bottom line. Sometimes, the loss of just one large customer can have a material effect on the utility's financial position. Credit concerns arise where any one customer plays a dominant role in the overall economic base of the service area. Moreover, large customers may turn to self generation and leave the distribution system altogether, potentially leading to reduced financial protection for the utility.

Similarly, for electric transmission companies, the total number of customers—largely



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Consequently, emphasis is placed on those areas that require management attention (in terms of time or money) and which, if unresolved, may lead to political, regulatory, or competitive problems.

In addition, the status of utility plant investment is reviewed, with regard to reliability and utilization, as well as for compliance with existing and contemplated environmental and other regulatory standards. The record of outages, system losses, and capacity utilization are examined. Important considerations include the projected capital improvements necessary to provide high-quality and reliable service. Additionally, unique operating challenges could be present that impact costs to a degree where credit quality suffers. Examples of operating challenges include harsh climates, severe storms, and difficult terrain.

Utilities in emerging countries face additional operating challenges, such as the fundamentals of metering and billing. Certain utilities may struggle with accurate and timely metering and billing because they do not have the appropriate technology, computer infrastructure, or control systems in place. Moreover,

distribution utility. Franchise monopolies are significant barriers to entry by competitors. Where there are nonexclusive franchises, other barriers to competitors exist, such as sitting difficulties caused by public concerns over duplicate utility poles and wires and environmental issues.

Transmission and distribution utilities do face competitive pressures in the form of substitute energy sources and customer self-generation and bypass. Electricity competes with other fuels such as natural gas for certain segments of the market, like space heating, water heating, and cooking. Thus, high electricity prices, which may be caused by inefficient transmission or distribution service, are cause for concern if customers have alternate energy sources. Self-generation has for many years been a significant concern for larger commercial and industrial customers who have been able to take advantage of cogeneration technologies to significantly reduce their reliance on, and, in some cases, disconnect from transmission and distribution systems. In the future, technology could pose a greater threat for transmission and distribution companies

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The assessment of management is based on such factors as tenure, industry experience, grasp of industry issues, and knowledge of customers and their needs. Management quality is also indicated by thoughtful balancing of public and private priorities, a record of credibility, and effective communication with the public, regulatory bodies, and the financial community.

Key financial policy considerations include commitment to credit quality. This can be assessed by evaluating accounting and financing practices, capitalization and common dividend objectives, and the company's philosophy regarding growth and risk taking.

### Generation qualitative analysis

Generation is the riskiest segment of the electric utility industry due to complex operating risks and the increasingly competitive nature of the business. Risk may be further heightened by absence of the regulatory umbrella. Because of the higher risks, generators can generally be expected to have business profile assessments in the 7-10 range.

Generation is a commodity business. Electrons are physically indistinguishable from each other and therefore compete primarily on price. However, electricity has some characteristics that make it less like other commodities. Electricity cannot be stored. Electricity must be used instantaneously, as it is produced, and its deliverability can be hampered by transmission constraints. Reliability and deliverability distinguish one generating company from another.

Regulation. Some generators may remain highly regulated and achieve superior business profiles due to the more stable revenue stream. Some centralized supply systems derive strength and stability from their highly cohesive nature, stemming, in part, from direct or indirect cross ownership between generators and distributors, and government entities as ultimate owners. However, most global generators operate in deregulated environments, where rates are determined by the market.

Even so, regulatory considerations are still pertinent, and vary among global electric utility systems. Regulation typically establishes the basic framework of the electricity market. The market may be primarily a wholesale, rather than retail, market. The system may mandate that all players bid into a pool or exchange, whereby generators are economically dispatched and the last unit to run sets the market clearing price for all players. A power pool may have rules regarding price bids, dispatch, financial standing of market players, or other factors. Generators may have an obligation to build—or may be limited in building or investing. Furthermore, political stability, legal environment, and contract law influence the generator's operating environment and are examined under this heading. In general, regulation is likely to constrain upside profit potential, while providing little protection on the downside.

Standard & Poor's seeks to determine the regulatory posture toward credit quality. The length of time that the regulatory framework has been in place is noteworthy, given the potential for a relatively new system to be

and perhaps elicit a premium in the marketplace. Value-added services, such as customization and load-following, can tailor the shape and firmness (or lack of firmness, for example, interruptible service) of electricity delivered to the customer.

Generation also faces unique operating risks. Because electricity cannot be stored, generating plants cannot afford to have unplanned outages. Of course, they are only paid when they run. Furthermore, contractual commitments could force a downed generator into the marker to seek replacement power, which could be costly—or unavailable if the outage occurs during a peak usage period. Thus, while low production costs factor heavily into the business profile of a generation company, other criteria are considered when assessing creditworthiness.

modified. The U.K. is notorious for having touted its competitive power pool, only to have the regulator step in and tamper with the pool's market clearing price.

In the U.S., the Federal Energy Regulatory Commission (FERC) has established regulations for nondiscriminatory interstate transmission pricing. Therefore, a transaction between a generation company and an end user will not be undermined by inflated wheeling fees. But market power issues are still being sorted out. FERC may prohibit mergers where bulking up on generation results in a utility being able to exert market power over its competitors. As a result, regulators may limit size and restrict certain contractual arrangements. Regulators may also set prudence requirements (financial creditworthiness) for entrants to the market. Questions asked include: How

will prices be established? Will there be a power pool or bilateral contracts only? (In bilateral contracts, buyers and sellers negotiate the terms, including cost, of the transaction.) Often times a pool transaction can be hedged to financially simulate a bilateral contract through "contracts for differences."

In some international systems, short-term marginal cost is determined by a pool, but the tariff also includes a charge to cover the long-run marginal cost of the next capital addition. This pricing system offers some greater assurance to the recovery of fixed costs and therefore lowers risk to the generator.

Markets. A generator's market expands as far as it can transport its electrons within physical (transmission) and economic (transportarion fees) constraints. It typically has no obligation to serve, and may be free to hand pick its customers and negotiate its own contracts. While it is anticipated that in the U.S. all customers will be able to choose their supplier (retail wheeling), other countries permit retail access to only the very largest industrial entities. Markets in these countries are primarily wholesale. It is anticipated in the U.S. that residential and small customers will initially tend to stick with their local utility distribution company for supply. However, in pilot programs to date, many customers have exercised their option to choose and left their traditional suppliers.

As electricity markets become more liquid, prices become more transparent, and energy marketers and financial derivatives begin to develop. It remains to be seen if marketers can aggregate small customer loads effectively to make them economically desirable.

If a generator sells directly to end users, it is important to know the customer mix, in terms of residential, commercial, and industrial segments. A diverse customer base within a stable, growing economy would be positive from a credit risk perspective. An economy that is driven by only a handful of products or industries introduces concentration risk.

Further marker evaluation looks at the economic prospects, inflationary pressures, and electricity consumption patterns within the country or region where the generating company operates. In developing countries, growth prospects would be higher than in a mature economy such as the U.S. However, strong growth could be subject to extreme volatility, due to recessionary or inflationary pressures. If

one or a few industries dominate the region, growth prospects could be tied to the fate of that industry.

In terms of supply, who are the other players in the market, and what are the barriers to entry? How much capacity is there relative to demand? Surplus capacity could reduce sales and/or put pressure on margins. A deficit capacity situation would inflate margins over the short term, but encourage other entrants to the market. This would not necessarily be bad, depending on the incremental cost of supply (lower cost would be a threat to existing generators, higher cost would enhance the generating company's compentive position) and the subsequent surplus situation. If transmission constraints are relieved, either through construction or technology, the supply/demand balance changes. Generators may have access to a broader market, but other suppliers will have access to their customers as well.

Operations. An analysis of operations overlaps somewhat with examination of markets and competitiveness. The market within which a generating company is a player (local, regional, national, or international) has implications for how it operates. Transmission interconnections and constraints, as well as the location of a plant relative to customers, provide operating limitations and opportunities. Having a strategic location might necessitate that the plant be run constantly to provide system voltage support. And the efficiency of a generator's operations is directly tied to its competitive position.

Managing production inputs effectively is crucial to competitiveness. Suppliers of fuel, labor, and supplies are sources of economic risk to a generator's ability to produce low-cost power. The generator can be at risk if supplies are disrupted or prices are raised. A generator should diversify risk, as opposed to relying on a few suppliers. What has been the historic growth of operating and maintenance expenditures, and how will they be controlled (or reduced) prospectively? Efficient use of technology enables a generation company to manage its costs more efficiently.

Fuel typically represents about half the cost per kWh. Generators will need to become sophisticated in physical and financial hedging of fuel commodity risk. To the extent that a generation company has contracted to sell its output at a fixed price, it will be necessary to match the length of fuel contracts and hedges

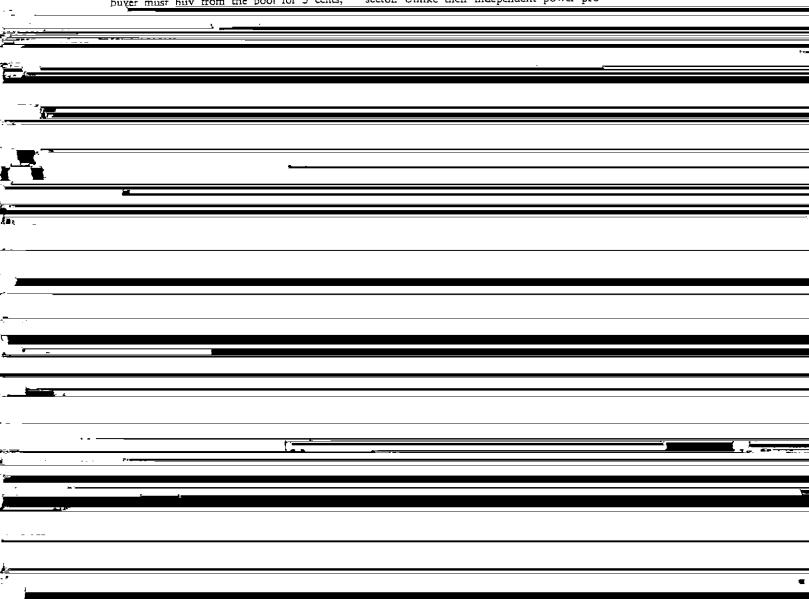
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to insure that margins are locked in. Some contracts permit a pass-through of fuel price changes, which might mitigate the necessity of hedging.

Contracts to sell a portion of production output at negotiated prices can protect generators from price and volume risk. Electricity markets are quite volatile, with prices fluctuating as much as 300% daily in U.S. markets. Contracts for differences are a common way to have price settlement around an erratic market clearing price. The mechanics, in very simple terms, are as follows: A buyer and seller agree on a price for power, say, 4 cents per kWh. If the market clears at 5 cents per kWh, the seller sells into the pool and receives 5 cents. The buyer must huy from the pool for 5 cents,

jects could transfer construction risks from the generator to the engineering firm. Lastly, environmental risks are evaluated. Imposition of a carbon tax could have significant financial consequences for coal-fired generation.

Diversity of the generation portfolio reduces the risk of dependence on any one unit, or any one fuel. Different fuel sources and the operating characteristics of the facilities (for example, base load versus peaking) further diversify the portfolio, and dual fuel capabilities at individual plants can enhance flexibility. Clearly, a single unit generator is inherently riskier than one with a portfolio of assets. The evolution of the merchant power plant has introduced a certain speculative element to the generation sector. Unlike their independent power pro-



#### STANDARD & POOR'S

with overcapacity. Since generators resemble other commodity industries, with their high capital costs, long-lived assets, and low labor content, they may pursue predatory price strategies in an attempt to gain market share. Thus, a generator's ability to beat its competitors' costs at the margin gives it a significant edge. In addition to analyzing marginal cost, Standard & Poor's compares a generator's average costs against contract prices, spot prices, pool prices, other producers, and new entrant costs.

Comparing costs, however, is not as straightforward as it might appear. The output of a plant greatly affects the cost of a unit of output, as fixed costs are spread over kWhs generated. This can make cost comparisons between base, intermediate, and peaking facilities difficult. The "peakier" the load curve, the higher the price of electricity at peak hours. As a result, a competitive strategy for a load-following generator might be to primarily operate during those more lucrative hours. First Hydro's generating plant in the U.K., a pumped storage hydro facility, has found this strategy to be quite

tion represent a threat to existing generating companies. New supplies may come from greenfield projects, renovation of existing facilities, or the opening of transmission pathways. Increasing power supply puts downward pressure on rates. Substitute products, particularly natural gas, also pose a competitive threat. This will become more complex as electric and gas markets "converge." Gas may become a greater threat to electricity usage over time due to the interchangeability of energy sources, as well as technological developments-such as gas-fired air conditioning. And further down the road, remote site applications such as the fuel cell may replace generation-produced power. Threat of these alternatives will depend on pricing, switching costs, availability, political and regulatory barriers, and public policy initiatives.

Management. The high business risk in generation—compared to transmission or distribution—makes management a critical factor in the credit evaluation of generators. In evaluating management, Standard & Poor's attempts to define management's risk appetite, and its overall goals and objectives. What strategies

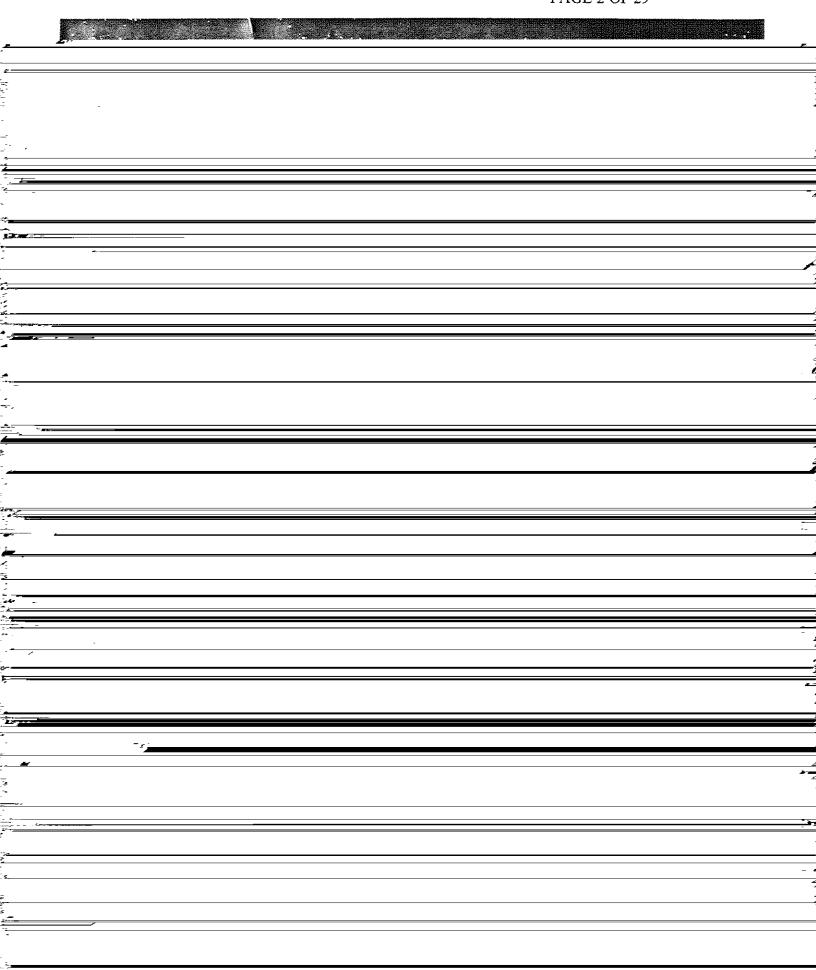
### CA-IR-121

Please provide a copy of the relevant pages of Moody's Power Sourcebook, 2003 edition, as cited on page 62, lines 15-17 of Dr. Morin's direct testimony.

# Dr. Morin's Response:

The 2004 edition of Moody's Power Sourcebook is now available and relevant pages are enclosed.

CA-IR-121 DOCKET NO. 04-0113 PAGE 2 OF 29



### Conditional Rating (\*)

Bonds for which the security depends on the completion of some act, or the fulfillment of some condition, are rated conditionally. These are bonds secured by a) earnings of projects under construction, b) earnings of projects unseasoned in operation experience, c) rentals which begin when facilities are completed, or d) payments to which some other limiting condition attaches. The parenthetical rating denotes probable credit stature upon completion of construction or elimination of the basis of the condition.

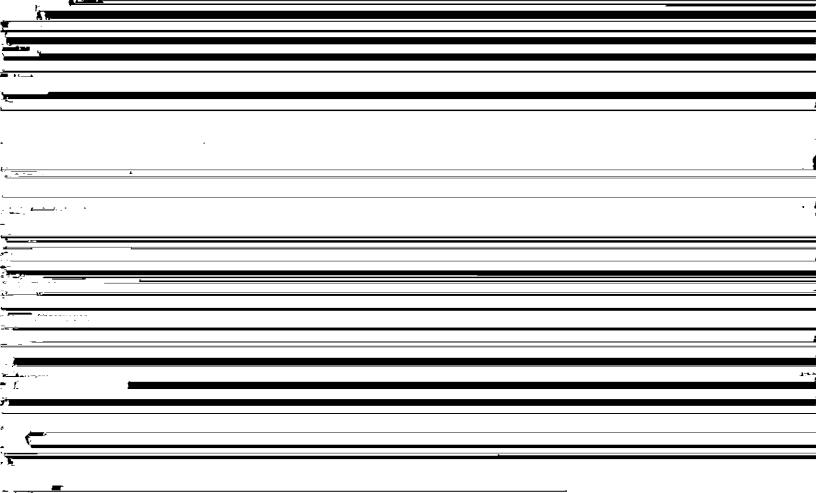
### **Expected Ratings Indicator**

To address market demand for timely information on particular types of credit ratings, Moody's has licensed to certain third parties the right to generate "Expected Ratings." Expected Ratings are designated by an "e" after the rating code, and are intended to anticipate Moody's forthcoming rating assignments based on reliable information from third party sources (such as the issuer or underwriter associated with the particular securities) or established Moody's rating practices (i.e., medium term notes are typically, but not always, assigned the same rating as the note's program rating). Expected Ratings will exist only until Moody's confirms the Expected Rating, or issues a different rating for the relevant instrument. Moody's encourages market participants to contact Moody's Ratings Desk or visit <a href="https://www.moodys.com">www.moodys.com</a> if they have questions regarding Expected Ratings, or wish Moody's to confirm an Expected Rating.

# Electric Utility/Po Rating Lists

**Global Power Watchlist** Ratings Under Review as of September 17, 2004

Issuer	Moody's Rating Long-Term	Moody's Rating Short-Term	Possible Direction	Date Reviewed
Avon Energy Partners Holdings	<b>B</b> 3		Upgrade	19-Jan-04
* Central Networks pic	Baa3		Upgrade	19-Jan-04
* * Central Networks West pic	Baa3	****	Upgrade	19-Jan-04
CMS Energy Corporation	B2		Upgrade	26-Jul-04
Cleco Evangeline LLC	B3	-	Upgrade	14-Sep-04
Cogentrix Energy, Inc.				
* Cogentrix Delaware Holdings, Inc.	Ba2	****	Upgrade	22-Jul-04
DPL Inc.	<b>Ba</b> 3		Downgrade	7-Apr-04
* Dayton Power & Light Company	Baa3		Downgrade	7-Apr-04
Dynegy Inc.	<del></del>			
* Illinois Power Company	Ba3		Upgrade	2-Aug-04
El Paso Electric Company	Baa3		Upgrade	2-Jul-04
Energy East Corporation	-			
* New York State Electric and Gas Corporation	Baa2		Upgrade	22-Jul-04
* Rochester Gas & Electric Corporation	Baa1		Upgrade	22-Jul-04
IDACORP, Inc.	Baa1		Downgrade	8-Jun-04
* Idaho Power Company	A2	P-1	Downgrade	8-Jun-04
International Power plc	Ba2		Downgrade	6-Aug-04
tnternational Power (Cayman) Limited	B1		Downgrade	6-Aug-04
Juniper Generation, L.L.C.	Ba3	-	Upgrade	7-May-04
Mational Grid Transco Plc	<del></del>	<del></del>		
ANational Grid USA	-		-	
Niagara Mohawk Power Corporation	Baa2	-	Upgrade	8-Apr-04
Mortheast Utilities			_	
Northeast Generation Company	Baa2		Downgrade	25-Mar-04
Scottish and Southern Energy plc	Aa3		Downgrade	1-Sep-04
SSE Energy Supply Ltd	<b>A</b> 3		Downgrade	1-Sep-04
35.8SE Generation Ltd	<b>A</b> 2		Downgrade	1-Sep-04
SSE Services Plc	Aa3		Downgrade	1-Sep-04
Marin Borten Down Notribution	PAR		D	4 0 04



### **Global Power Ratings Changed** From September 1, 2003 To September 20, 2004

**UPGRADES** Short-Term Long-Term To **Date Changed** From From To Upgrade Percentage: 49.00%\* 9-Jun-04 **B2 B**3 AES Corporation, (The) 4-Mar-04 **B**2 Ba3 AES Gener S.A. 13-Sep-04 **B2** Caa1 19-Jan-04 Aquila, Inc. **B**3 Caa1 Avon Energy Partners Holdings 26-Nov-03 Ba1 Ba2 CE Generation LLC. 16-0ct-03 **A**3 A1 **CLP Holdings Limited** 16-0ct-03 A1 **A3 CLP Power Hong Kong Limited** 26-Nov-03 Ba2 ВаЗ Caithness Coso Funding Corp. 28-May-04 Ba1 Ba2 Caithness Coso Funding Corp. 5-Feb-04 ВаЗ **B**1 Cogentrix Energy, Inc. 30-Apr-04 Aa3 **A**1 27-Apr-04 E.ON AG **B**2 Caa1 EES Coke Battery Company, Inc. 1-Sep-04 Ba3 **B2** EES Coke Battery Company, Inc. 23-0ct-03 Baa3 Ba2 East Coast Power LLC. 25-Nov-03 Bal ₿2 **Edison Funding Company** 25-Nov-03 Ba2 В3 Edison International 6-Aug-04 Baa3 Ba2 Edison International 6-Aug-04 **B**1 **B2** Edison Mission Energy 4-Mar-04 A3 Baal 18-Nov-03 Eesti Energia AS Ba2 Empresa Nacional de Electricidad, S.A.(Chile) Ba3 18-Nov-03 Ba3 Ba2 25-Aug-04 Enersis S.A. (P)Baa2 (P)Baa3 Entergy Arkansas, Inc. 25-Aug-04 Baa2 Baa3 Entergy Louisiana, Inc. 29-Jul-04 Baa2 Baa1 Hidroelectrica del Cantabrico, S.A. 4-Feb-04 **B2** Caal Illinois Power Company 7-May-04 Ba3 **B**1 Juniper Generation, L.L.C. 6-Aug-04 Caa2 В3 Mission Energy Holding Company 19-Apr-04 **A**3 Northern States Power Company (Minnesota) Raa1 19-Apr-04 **A**3 Baa1 Northern States Power Company (Wisconsin) 6-Feb-04 **B**1 A3 Nuon Power Generation BV 23-0ct-03 **B2** Caa2 Pacific Gas & Electric Company 23-Dec-03 Ba2 82 Pacific Gas & Electric Company 19-Apr-04 Baa2 Baa1 Public Service Company of Colorado 9-Mar-04 Baa2 Baa3 Public Service Company of New Mexico 25-Nov-03 Baa3 Ba3 Southern California Edison Company 6-Aug-04 ВааЗ Baa1 Southern California Edison Company 29-Jul-04 Baa2 A3 TXU Australia Holdings (Ptnrshp) Ltd. Ptnrshp 29-Jul-04 АЗ Baa2 TXU Electricity Limited 12-Nov-0: Baa3 Baa2 Tenaga Nasional Berhad 19-Apr-04 Baa1 Baa3 Xcel Energy Inc.

Note: The long-term rating listed is for the most senior debt Moody's rates.

ents the number of rating changes out of total rating changes

### **Global Power Ratings Changed**

Nuon N.V.

TEGO Energy, Inc.

Nuon N.V.
PSEG Energy Holdings L.L.C.
Permsylvania Electric Company
Pepco Holdings, Inc.
Potomac Capital Investment Corporation
Potomac Electric Power Company
SSE Energy Supply Ltd
TROT Energy Inc.

From September 1, 2003 To September 20, 2004

			DOWNGRADE	S	
	Long	-Term	Shor	t-Term	
Downgrade Percentage: 51.00%*	From	То	From	То	Date Changed
AES Puerto Rico, L.P.	Baa2	Baa3			17-Dec-03
AES Sul Distribuidora Gaucha de Energia S.A.	Caa1	Ca			14-Apr-04
Atlantic City Electric Company	<b>A</b> 3	Baa1	P-1	P-2	7-Nov-03
Calpine Corporation	B1	Caa1			20-Oct-03
CenterPoint Energy, Inc.	<b>Ba</b> 1	Ba2	-		27-Feb-04
Conectiv	Baa1	Baa2			7-Nov-03
DPL Inc.	Ba1	Ba2			17-Mar-04
DPL Inc.	Ba2	Ba3			7-Apr-04
Dayton Power & Light Company	Baa1	Baa2	P-2	P-3	17-Mar-04
Deplies Darine & Florid Postanonu	Bass	B-2-2	₽-3	AID	7 Apr 04

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	FirstEnergy Corp.	Baa2	Baa3			6-Feb-04	
	International Power plc	Ba3 , A2	B1 Baa1		_	29-Jun-04 6-Feb-04	
	Jersey Central Power & Light Company Kansas City Power & Light Company	, A2 A2	A3	P-1	P-2	12-Nov-03	
	Metropolitan Edison Company	ÃŽ	Baa1			6-Feb-04	
	Northeast Generation Company	Baa2	Baa3			17-Sep-04	
	Northern Electric Distribution Ltd	A3	Baa1			17-Mar-04	
	Northern Electric pic	Baa1	Baa2			17-Mar-04	
	Nuon Finance B.V.	AT .	A2	<del>****</del>		6-Feb-04	
	Nuon N.V.	A1	A2			6-Feb-04	

Baa3

**A2** 

Baa1 Baa1

**A2** 

A1

A1

Ba1

A2 Ba3

Baa2 Baa2

Baa2

Baa1

A3 A2

Ba2

12-Sep-03

6-Feb-04 7-Nov-03

7-Nov-03

7-Nov-03

7-Jun-04

1-Apr-04

10-Feb-04 R. hen-OA

### **Global Power Ratings Confirmed** From September 1, 2003 To September 17, 2004

Issuer	Long-Term	Short-Term	Date Confirmed
Allegheny Energy Supply Company, LLC	B3	_	28-Jan-04
Allegneny Energy Supply Company, CCO	<b>B</b> 2		28-Jan-04
Allegheny Energy, Inc.	B3		28-Jan-04
Allegheny Generating Company	A3		8-Jul-04
Ameren Corporation	Ba1		28-May-04
CE Generation LLC.	Baa2		7-0ct-03
CenterPoint Energy Houston Electric, LLC	Ba1		7-0ct-03
CenterPoint Energy Resources Corp.	Baa2		6-Feb-04
Cleveland Electric Illuminating Company	Ba3		30-Dec-03
Companhia Energetica de Brasilia - CEB	Baa2	P-2	28-Jan-04
DTE Energy Company	A3	P-2	28-Jan-04
Detroit Edison Company (The)	Baa1	P-2	2-0ct-03
Dominion Resources Inc.	Ba1		22-Jun-04
Edison Funding Company	Baa3		2-0ct-03
Kincaid Generation, L.L.C.	Ba1		28-Jan-04
Monongahela Power Company	A1	P-1	12-Nov-03
National Rural Utilities Coop. Finance Corp.	Ba2		2-Sep-03
Nevada Power Company		P-2	11-Dec-03
Northern States Power Company (Minnesota)	Baa1		6-Feb-04
Ohio Edison Company	Baa3		26-Mar-04
PPL Montana, LLC	Baa1	-	12-Sep-03
PSEG Power L.L.C.	Baa1	<del>,</del>	6-Feb-04
Pennsylvania Power Co.		₽-2	7-Nov-03
Pepco Holdings, Inc.	Baa2	P-3	20-Nov-03
Portland General Electric Company	Ba1		28-Jan-04
Potomac Edison Company (The)		P-2	11-Dec-03
Public Service Company of Colorado	(P)Baa2	<u> </u>	12-Sep-03
Public Service Enterprise Group Incorporated	Baa2	P-2	15-Dec-03
Puget Sound Energy, Inc.	Aa3		26-Sep-03
Scottish and Southern Energy plc	Ba2		2-Sep-03
Sierra Pacific Power Company	B2		2-Sep-03
Sierra Pacific Resources	Aa3		26-Sep-03
Southern Electric Power Distribution plc	Baa1		19-Apr-04
Southwestern Public Service Company	Baa3		29-Jul-04
Tenaska Georgia Partners, L.P.	Baa2	****	6-Feb-04
Toledo Edison Company	Ba2		25-Nov-03
Tucson Electric Power Company	A2	P-1	2-0ct-03
Virginia Electric and Power Company	*****	P-1	25-Nov-03
WPS Resources Corporation	Ba1	-	28-Jan-04
West Penn Power Company		P-1	14-0ct-03
Wisconsin Electric Power Company Wisconsin Public Service Corporation		P-1	25-Nov-03
WISCONSIN PUDIIC DELVICE COLIPCIADOLI			

#### **U.S. Electric Industry Peer Group**

September 17, 2004

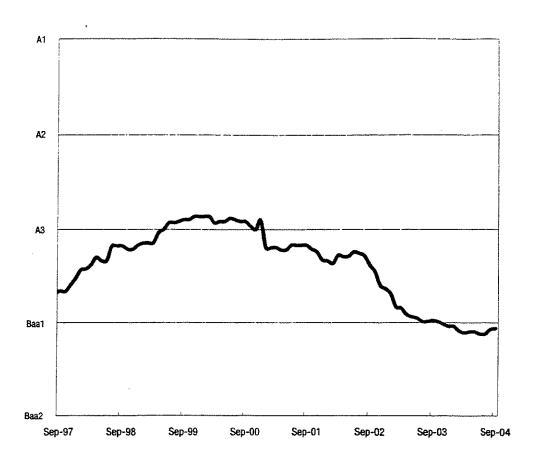
AEP Texas Central Company **AEP Texas North Company** Alabama Power Company ALLETE, Inc. **AmerenCIPS** AmerenUE Appalachian Power Company Aquila, Inc. Arizona Public Service Company Atlantic City Electric Company Avista Corp. Baltimore Gas and Electric Company Black Hills Corporation Boston Edison Company Cambridge Electric Light Company Canal Electric Company Central Hudson Gas & Electric Corporation Central Illinois Light Company Central Maine Power Company Central Vermont Public Service Corp. Cincinnati Gas & Electric Company (The) Cleco Power LLC Cleveland Electric Illuminating Company Columbus Southern Power Company Commonwealth Edison Company Commonwealth Electric Company Connecticut Light and Power Company Consolidated Edison Company of New York, Inc. Consumers Energy Company **Dayton Power & Light Company** Delmarva Power & Light Company Detroit Edison Company (The) Duke Energy Corporation Duquesne Light Company astem Edison Company Paso Electric Company moire District Electric Company (The) mangy Arkansas, Inc. Thergy Gulf States, Inc. menty Mississippi, Inc. Denty New Orleans, Inc. Forda Power & Light Company gia Power Company

Mountain Power Corporation Company
Color Electric Company, Inc.
D. Power Company S Power Company Ta Michigan Power Company A social Power & Light Company Power and Light Company
Company Gas and Electric Company Cantral Power & Light Company City Power & Light Company Sas & Electric Co. Security Company Visites Co. dighting Company 23 & Electric Company

Sand Electric Company

Massachusetts Electric Company Metropolitan Edison Company MidAmerican Energy Company Mississippi Power Company Monongahela Power Company Narragansett Electric Company Nevada Power Company **New England Power Company** New York State Electric and Gas Corporation Niagara Mohawk Power Corporation Northern Indiana Public Service Company Northern States Power Company (Minnesota) Northwestern Corporation Ohio Edison Company **Ohio Power Company** Oklahoma Gas & Electric Company Orange and Rockland Utilities, Inc. Otter Tail Corporation Pacific Gas & Electric Company **PacifiCorp** PECO Energy Company Pennsylvania Electric Company Pennsylvania Power Co. Portland General Electric Company Potomac Edison Company (The) Potomac Electric Power Company PPL Electric Utilities Corporation Progress Energy Carolinas, Inc. Progress Energy Florida, Inc. PSI Energy, Inc. Public Service Company of Colorado Public Service Company of New Hampshire Public Service Company of New Mexico Public Service Company of Oklahoma Public Service Electric and Gas Company Puget Sound Energy, Inc. Reliant Energy HL&P Rochester Gas & Electric Corporation San Diego Gas & Electric Company Savannah Electric and Power Company Sierra Pacific Power Company South Carolina Electric & Gas Company Southern California Edison Company Southern Indiana Gas & Electric Company Southwestern Electric Power Company Southwestern Public Service Company System Energy Resources, Inc. Tampa Electric Company Tennessee Valley Authority Texas-New Mexico Power Company Toledo Edison Company Tucson Electric Power Company TXU US Holdings Company United Illuminating Company Virginia Electric and Power Company West Penn Power Company Westar Energy, Inc. Western Massachusetts Electric Company Wisconsin Electric Power Company Wisconsin Power and Light Company Wisconsin Public Service Corporation

U.S. Electric Utility Rating History September 2004



5.12         6.83         159.41         16.86         495         48.07           4.06         6.87         17.7         20.8         1,417         40.06           4.06         6.87         138.56         18.83         956         44.06           7.68         10.4         115.47         24.27         9,713         38.13           5.09         6.98         14.87         281.64         45.06         882         32.04           7.45         10.86         18.06         29.59         4,891         39.05           4.74         6.05         166.80         165.01         16.89         32.04         46.97           4.75         16.86         165.01         16.89         3.944         70.7         48.3           6.7         7.71         165.01         16.89         3.934         70.7         48.3           6.42         10.46         6.28         165.20         4.83         4.85         4.83           1.66         2.41         127.74         8.19         39.94         70.7           6.42         10.41         127.74         8.19         39.94         70.7           6.42         10.41         127.74 <th>Rating Co.</th> <th>Rating Company</th> <th>Revenue</th> <th>Net Income</th> <th>Operating Marcin</th> <th>EBIT/ Interest</th> <th>FF0/</th> <th>FF0 %</th> <th>2</th> <th>Total Cap.</th> <th>Tot. Debt %</th> <th></th> <th>Pref Stk % Common %</th>	Rating Co.	Rating Company	Revenue	Net Income	Operating Marcin	EBIT/ Interest	FF0/	FF0 %	2	Total Cap.	Tot. Debt %		Pref Stk % Common %
2         WithStands Public Service Company         1,725         80         102.4         51.2         68.3         158.1         1,68.0         40.0         40.0         40.0         40.0         40.0         40.0         31.1         1.17.7         2.18.0         40.0	Aa2	*Madison Gas and Electric Company	407	6	,   ;		16010111	Varies	MCF № 10	(ill Smit)	Tot. Cap	Tot. Cap	Tot. Cap
Thirdis Power Company   Reg	Aa2	*Wisconsin Public Service Compration	704	8	10.24	5.12	6.93	159.41	16.86	405	40.07	,	
Thorizo Prover & Light Company   6.233   733   15.03   14.59   14.59   14.51   14.50   15.41   14.50   15.41   14.50   15.41		AVERAGE OF RATING GROUP	871,1	2	8.7	3.0	6.82	117.7	20.8	1.417	40.04	- ;	51.93
Wissessip Power Company   8.28   7.38   16.03   7.88   10.4   115.47   24.27   27.79			3	8	9.4/	4.06	6.87	138,56	18.83	8	40.00		56.33
Wisconsin Electric Power Company   252   256   164   265   1448   164   4566   813   205   478   164   4566   813   205   478   47	Aa3	*Florida Power & Light Company	R 203	793	40.03	ř				}		<b>5</b> :-	54.13
Web A	Aa3	*Mississippi Power Company	870	3 5	10,03	90.7	10.4	115.47	24.27	9.713	38 13	100	Š
AVERAGE OF RATING GROUP         3,695         354         16,28         7,48         16,38         14,487         19,45         4,79         4,59         17,59         4,487         4,69         6,68         14,487         4,69         7,59         4,79         4,79         7,79         4,79         4,79         7,79         4,70         4,70         4,70         4,70         4,70         4,70         4,70         4,70	Aa3	"Wisconsin Electric Power Company	2 522	250	10.03	9.58	14.59	281.64	45.06	882	32.04	0.03	18.10
Valchame Fover Company   3,909   473   25,83   745   10.66   180.66   25,69   4,79   25,83   745   10.66   16.88   16.23   2,79   2,7		AVERAGE OF RATING GROUP	2,042	007	18.69	5,09	6.98	144.87	19.45	4 078	46.03 AB.03	7.58	60.39
*Authenne Power Company         3,960         473         25,83         4,74         6,05         166.8         16,23         6,275         4,93         2,13         4,94         7,5         8,06         16,20         16,21         16,50         17,3         4,94         7,5         16,50         16,20         17,3         4,94         7,5         16,50         16,20         1,73         4,94         7,5         16,50         16,20         16,20         17,3         4,94         7,5         16,50         16,20         16,20         16,73         4,95         16,70         16,90         17,3         4,94         16,70			0,030	334	16.83	7.45	10.86	180.66	29.59	4.89	10.05	0.75	52.28
**Ameneruff         2,557         413         2,585         474         6,05         16,68         16,23         6,076         68,33         8,33           **Gergle Power Company         4,914         6,31         2,491         6,75         7,71         16,51         16,78         6,175         41,52         2,18           **Gergle Power Company         81,75         1,401         41,1         1,66         2,21         16,78         3,175         43,52         2,18           **Gerbug Prode, Impany         3,192         29,81         1,67         3,74         8,19         3,99         3,77         1,67         3,17         4,17	¥	*Alabama Power Company	3,000	ţ		,					70.00	£,73	58.16
Grandle Power Company         Charactery (State Power Company)         Charactery (State Power LL)         Charactery (State Power Company)	A:	*Amerentif	3,300	4/3	25.63	4.74	6.05	166.8	16.23	8 076	40.33	ć	
Could Power Company         4714         671         7.71         165.01         16.89         17.72         16.91         17.71         16.91         17.71         16.92         17.92         17.91         16.92         17.91         17.91         17.92         17.92         17.92         17.92         17.92         17.92         17.92         17.92         17.92         17.92         17.93         18.93         47.92         17.93         18.93         47.93         47.93         47.93         47.93         47.93         47.93         47.93         47.93	A	*Secreta Power Company	2,03/	441	29.84	7.5	8.26	151.49	20.78	5,010 F 17E	40,00	85.83 85.83 85.83	43.34
Victor-Outside   Victor Company   Vict	A	*Guiff Dougs Company	4,914	63‡	24.91	6.7	7.71	165,01	16.89	0.307	45.52	2,18	54.3
Vincture Company   Vincture Co	4	*Under Outparty	878	69	17.31	4.89	6.28	165.28	15.53	1904	20.14	10.16	48.32
Progress Cherry Power Company   3152   291   18.19   64.2   10.41   695.1   32.71	. **		8,155	1,400	<u>+:</u>   <del>↓</del>	1.66	2.41	127.74	20.01	607'-	48.7	5.99	45.3
Variables Electric and Power Company         3,152         295         16,75         5,44         7,04         97,83         16,42         1,07         43,34         2,37           South Caroline Electric and Power Company         1,832         213         16,75         5,06         89         14,239         16,827         469         58,7         0           AVERAGE of FAINId GROUP         3,140         400         22,87         5,06         85         187,23         1,555         29,73         3,93           AVERAGE of FAINId GROUP         3,140         400         22,87         5,06         8,5         187,23         46,31         3,83         29,73         3,93           Central Illinois Light Company         1,07	<b>.</b>	**************************************	892	91	18.19	6.42	10.41	69.51	33.34	## 60 F	70.7	0	29.3
Saventina Hilmois Light Company         3,769         274         18,07         5.26         6.98         16,39	{	Progress Energy Florida, Inc.	3,152	295	16,75	5.44	7.04	07.83	12.20	1,0/8	43.54	2.37	54.09
Webstream Light Company         1,832         213         324         415         65         88         11,53         4379         58.57         0           Web Age of Parting Campany         1,617         112         12.75         5.06         8.5         18.72         46.31         1,525         29.73         3.93           Central Illinois Light Company         1,224         40         1,526         3.31         7.88         16.55         2.87         3.93         46.88         3.83         48.89         3.83         48.89         3.83         48.89         3.83         48.89         3.83         48.89         3.83         48.89         3.83         48.89         3.83         48.89         3.83         48.89	7 4	Savannan Electric and Power Company	3,769	274	16.07	5.26	80.8	140 30	10,43	4,483	51.53	0.76	47.71
Wisconsein Power and Ught Company         1,217         112         15,75         5,06         6,75         17,25         17,25         26,37         2,63           Wisconsin Power and Ught Company         1,217         112         15,75         5,06         6,78         17,23         4,31         5,63         4,34         1,557         2,63         3,63         48,93         3,63         48,93         3,63         48,93         3,63         48,93         3,63         48,93         3,63         48,93         4,63         1,755         2,63         3,63         48,93         3,63         48,93         3,63         48,93         48,93         3,63         48,93         48,43         48,93         48,43         48,43	₹ ₹	South Carolina Electric & Gas Company	1,832	213	23.2	3.24	, the state of the	60.03	120.27	450	58.57	0	41.43
Vortified Edectric Company	Æ	Wisconsin Power and Light Company	1,217	112	15.75	5.06	. a	187.23	50.74	4,379	50.72	2.63	46.65
*Central Illinois Light Company         622         19         6.45         3.31         7.84         126.44         19.33         601         3.65         6.66           *Yearss Olf Power Company         1.097         125         2.663         2.05         4.74         176.44         19.33         601         3.96         6.66           *Yearss Olf Power & Light Company         1.097         125         2.663         2.05         4.74         176.44         19.33         601         3.95         51.87         2.92           *Northern States Power Company (Minnesotta)         1.1094         88         16.35         5.83         9.49         17.86         17.81         2.214         61.87         4.95           *Northern States Power Company (Minnesotta)         1.1094         88         16.35         5.83         9.49         17.86         4.72         4.75         4.66         5.89         17.86         4.57         4.95           *Northern States Power Company (Minnesotta)         1.517         115         1.42         4.66         5.89         127.1         4.95         4.95         1.05         4.86         4.74         17.83         4.87         4.75         4.95         4.95         4.95         4.95         4.		AVEHAGE OF RATING GROUP	3,140	9	22.87	5.05	8 <b>4</b>	12/21	40.01	1,525	29.73	3.93	66.34
"Central lilinols Light Company         B22         19         6.45         3.31         7.88         126.44         19.33         601         39.6         6.66           "Central lilinols Light Company         780         55         15.57         2.05         4.24         12.86         13.36         17.95         51.87         2.92           "Varians City Power Company (Minnesota)         1,094         88         16.35         5.89         122.14         12.12         2.214         61.36         9.89           "Northern States Power Company (Minnesota)         3,177         193         12.44         3.13         5.51         161.89         17.86         3.812         4.35         4.96         12.21         4.75         4.55         4.66         5.89         17.81         4.73         4.57         4.55         4.75         4.66         5.89         17.81         4.73         4.75         4.66         5.89         4.73         4.76         4.73         4.75         4.75         4.89         5.74         4.75         4.55         4.95         4.73         4.75         4.89         5.74         4.75         4.89         4.73         4.74         6.74         4.75         4.55         4.99         4.75 <th< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th>5</th><th>24.0</th><th>¥.</th><th>7,635</th><th>48.69</th><th>3.63</th><th>47.68</th></th<>							5	24.0	¥.	7,635	48.69	3.63	47.68
Tighth Power Company   780   55   15.57   2.05   4.24   129.06   13.35   1787   2.92   1787   1287   1287   128.04   129.05   1787   1287   1287   128.04   129.05   13.35   1787   1287   128.04   129.05   128.14   129.05   128.14   129.05   13.77   13.77   13.77   13.77   13.77   13.77   13.77   13.77   13.77   13.75   12.14   129.05   17.86   12.12   2.214   15.75   4.55   14.25   16.18   17.86   18.75   18.	Z :	*Central Illinois Light Company	822	19	6.45	60	7 88	106 44	C C	č			
*Collabelia Gas Electric Company         1,057         125         26.63         4         74         12.30         1,790         91.87         2.92           *Vorthem States Power Company (Minnesotal)         1,094         16.35         5.83         9.49         122.14         13.70         45.72	A2	"Idaho Power Company	780	52	15.57	2.05	20° 4	120.02	13.03	100	39.6	6.66	53.74
**Louisville Gas & Electric Company         1,094         88         16.35         5.83         9.49         122.14         61.36         0           **Northern States Power Company (Minnesota)         3,177         193         12.44         3.13         5.51         161.89         17.86         3,812         6.22.74         4.95           **Northern States Power Company (Minnesota)         3,177         193         12.44         3.13         5.51         161.89         17.86         3,812         6.22.74         4.95           **Northern States Power Company (Misconsin)         602         57         10.95         5.5         5.95         17.91         762         44.23         0           **Virginia Electric and Power Company         1,811         152         16.27         4.08         6.04         126.5         23.68         10,456         55.34         2.46           AVERAGE OF RATING GROUP         1,811         152         16.27         4.08         6.04         126.5         2.89         49.48         2.16           AVERAGE OF RATING GROUP         1,811         152         16.27         4.08         6.07         126.52         2.0.59         4.94         2.16         2.0.59         2.18         4.77         16.20	Z :	"Kansas City Power & Light Company	1,057	125	26.63	 4	4.74 A.74	176.64	13.30	1,795	51.87	2.92	45.21
**Northern States Power Company (Minnesota) 3,177 193 12.44 3.13 5.51 16.2.14 30.5 16.2.14 30.5 16.2.14 30.5 16.2.14 30.5 16.2.14 30.5 16.2.14 30.5 16.2.14 30.5 16.2.14 30.5 16.2.5 16.2.5 16.2.5 16.2.5 16.2.7 16.2 16.2.7 16.2 16.2.7 16.2 16.2.7 16.2 16.2.7 16.2 16.2.7 16.2 16.2.7 16.2 16.2.7 16.2 16.2.7 16.2 16.2.7 16.2 16.2.7 16.2 16.2.7 16.2 16.2.7 16.2 16.2.7 16.2 16.2.7 16.2 16.2 16.2 16.2 16.2 16.2 16.2 16.2	A2	*Louisville Gas & Electric Company	1,094	88	16.35	r 83	7070	+0.04	27.72	2,214	61.36	0	38.64
Worthern States Power Company (Wisconsin)         602         57         17.5         4.66         5.89         17.81         5.55         0           Volkahoma Gas & Electric Company (Wisconsin)         1,517         115         14.25         5.5         9.59         227.1         30.47         1,677         45.15         0           Virginia Electric and Power Company (Wisconsin)         1,517         115         14.25         5.5         9.59         227.1         30.47         1,677         45.15         0           AVERAGE OF RATING GROUP (Company Processing Company (Company Company Company Company Company (Company Company C	A2	*Northern States Power Company (Minnesota)	3,177	193	12.44	3.3	0.43 4.43	124 90	30	1,8/2	45.72	4.95	49.34
*Oklahoma Gas & Electric Company         1,517         115         14,25         5.5         9.59         193.38         17,91         46,15         44,23         4.95         4.95         193.38         17,91         46,15         47,17         46,15         20,15	A2	*Northern States Power Company (Wisconsin)	602	57	17.5		- C	101.69	17.86	3,812	52.55	0	47.45
Virginia Electric and Power Company         5,437         567         20,95         4.19         6.04         126.5         23.68         10,456         55.34         2.46           AVERAGE OF RATING GROUP         1,811         152         16.27         4.09         6.04         126.5         23.68         10,456         55.34         2.46           AVERAGE OF RATING GROUP         1,811         152         16.27         4.09         6.04         126.5         23.68         10,456         55.34         2.46           *AEP Texas North Company         466         56         14.6         4.32         4.97         187.55         23.11         598         59.73         0.39           *Columbus Southern Power LLC         707         57         16.2         3.87         4.77         162.92         27.18         856         47.94         0.39           *Columbus Southern Power Company         1,432         172         15.75         6.08         7.74         251.9         19.97         1,800         50.71         0           *Interstate Power and Light Company         1,371         87         14.29         4.88         7.46         139.71         4.36         2.52         2.0.86         2.164         43.68	<b>A</b> 2	*Oklahoma Gas & Electric Company	1 517	1 2	2. 4.	00.1	0.00	193.38	16.71	762	44.23	0	55.77
AVERAGE OF RATING GROUP         1,811         152         16.27         4.08         6.67         126.5         23.68         10,456         55.34         2.46           AEP Texas North Company         466         56         14.6         4.32         4.97         187.55         23.11         598         59.73         0.39           *Cleco Power LLC         707         57         16.2         3.87         4.77         162.92         27.18         856         47.94         0.39           *Columbus Southern Power Company         1,432         172         15.75         6.08         7.74         251.9         19.97         1,800         50.71         0           *Detroit Edison Company         1,432         172         15.75         6.08         7.74         251.9         19.97         1,800         50.71         0           *Interstate Power and Light Company         1,377         87         14.29         4.88         7.46         130.03         25.66         2,577         0.98         7.854         62.27         0           *MidAmerican Energy Company         2,245         256         18.7         14.29         4.88         7.46         130.03         25.66         2,527         46.56         1	A2	Wirdinia Electric and Phwer Connerv	5.637	587	30.05		60.0	227.1	30.47	1,677	45.15	0	54.85
*AEP Texas North Company 466 56 14,6 4,32 4,97 187,55 23.11 598 59,73 0.39  *Columbus Southern Power Company 1,432 172 15,75 6.08 7,74 251,9 19,97 1,800 50,11 0  *Detroit Edison Company (The) 3,695 252 18,24 2,37 3,74 134,14 9,88 7,854 62.27 0  *Postorit Edison Company (The) 3,695 252 18,24 2,37 3,74 134,14 9,88 7,854 62.27 0  *Pacificorp Power Company (The) 2,245 256 2,527 46,56 2,527 4		AVERAGE OF RATING GROUP	18:1	152	16.77	- <b>2</b>	0.04	126.5	23.68	10,456	55.34	2,46	42.21
*AEP Texas North Company         466         56         14,6         4.32         4.97         187.55         23.11         598         59.73         0.39           *Cleco Power LLC         707         57         16.2         3.87         4.77         162.92         27.18         856         47.94         0           *Columbus Southern Power Company         1,432         172         15.75         6.08         7.74         251.9         19.77         1,800         50.11         0           *Detroit Edison Company         1,432         172         15.75         6.08         7.74         251.9         19.87         1,800         50.11         0           *Instratate Power and Light Company         1,371         87         16         3.36         5.59         55.75         20.86         2,164         43.68         8.5           *MidAmerican Energy Company         2,245         250         18,72         4.88         7.46         130.03         25.66         2,527         46.56         1.26           *Pollio Power Company         1,503         13,14         9.88         7.46         130.03         25.66         2,527         46.56         1.26           *PacifiCorp         *Programs <t< td=""><td></td><td></td><td></td><td>!</td><td></td><td>8</td><td>0.00</td><td>70'00'</td><td>60.02</td><td>2,839</td><td>49.48</td><td>2.12</td><td>48.4</td></t<>				!		8	0.00	70'00'	60.02	2,839	49.48	2.12	48.4
**Columbus Southern Power Company 1,432 172 15.75 6.08 7.74 251.9 19.77 16.29 27.18 856 47.94 0.39 0.39 0.49 0.40 0.40 0.40 0.40 0.40 0.40 0.4	A3	*AEP Texas North Company	466	<b>3</b> 2	14.6	4.32	4.97	187.55	22 11	200	24 07	6	
**Columbus Southern Power Company 1,432 172 15,75 6.08 7,74 251.9 19.37 1,800 47,34 0 1.0 47,34 0 1.0 47,34 0 1.0 47,34 0 1.0 47,34 0 1.0 47,34 0 1.0 47,34 0 1.0 47,34 0 1.0 47,34 0 1.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4	. A3	*Cleco Power LLC	707	57	16.2	3.87	4.77	162 92	27.18	020	08.73	0.39 0	39.87
**Toefroff Edison Company (The) 3,695 252 18.24 2.37 3.74 134.14 9.88 7,854 62.27 0 1,371 87 14.29 4.88 7,46 130.03 25.66 2,527 46.56 1.26 **Ohlo Power Company 2,245 250 160.2 4.75 6.54 241.45 20.29 3,580 57.98 0.67 **Pacificoro 3,194 246 19.37 2.41 3.83 105.32 14.45 7.265 53.53 1.34 **Ohlo Power Company 2,245 250 160.2 26.92 4.94 6.65 2.029 3,580 57.98 0.67 **Pacificoro 3,194 246 19.37 2.41 3.83 105.32 14.45 7.265 53.53 1.34 **Ohlo Power Company 3,600 502 26.92 4.94 6.65 206.33 19.39 6,711 50.89 0.88	A3	*Columbus Southern Power Company	1,432	172	15,75	6.08	7.74	251.0	10.07	000	40.74	0	52.06
**Interstate Power and Light Company 1,371 87 16 3.36 5.59 55.75 20.86 2,164 43.68 8.5 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	A3	*Detroit Edison Company (The)	3,695	252	18.24	2.37	3.74	134 14	0 00	000,1	20.1	<b>-</b> (	49.89
**MidAmerican Energy Company 2,596 187 14,29 4,88 7,46 130,03 25,66 2,527 46,56 1.26   **Ohlo Power Company 2,245 250 16,02 4,75 6,54 241,45 20.29 3,580 57,98 0.67   **PacifiCorp 3,194 246 19,37 2,41 3,83 105,32 14,45 7,265 53,53 1.34   **Progress Energy Carolinas, Inc. 3,600 502 26,92 4,94 6,65 206,33 19,39 6,711 50.89 0,88	A3	"Interstate Power and Light Company	1.371	87	9	3.36	7 20	75 75	20.00	\$ CO.	12.20	0	37.73
**Ohlo Power Company 2,245 250 16.02 4.75 6.54 20.29 3,580 57.98 0.67 PSI Energy, Inc. 1,603 131 19.45 3.73 5 101.28 11.97 3,665 54.28 1.16 Progress Energy Carolinas, Inc. 3,600 502 26.92 4.94 6.65 206.33 19.39 6,711 50.89 0.88	A3	*MidAmerican Energy Company	2,596	187	14.29	4 88	7 40	190.00	20.36	2,164	43.68	8.5	47.82
**PSI Energy, Inc. 1,603 131 19.45 3.73 5.34 20.29 3,580 57.98 0.67 **PacifiCorp 3,194 246 19.37 2.41 3.83 105.32 14.45 7,265 54.28 1.16 **Progress Energy Carolinas, Inc. 3,600 502 26.92 4.94 6.65 206.33 19.39 6,711 50.89 0.88	A3	*Ohlo Power Company	2.245	250	18.02	4.75	0 F. U	30.03	70.00	7,527	46.56	1.26	52,18
**PacifiCorp** PacifiCorp** 3,194 246 19.37 2.41 3.83 105.32 14.45 7,265 54.28 1.16	A3	*PSI Energy, Inc.	1,603	131	19.45	2.5	, ,	101.43	20.29 •	3,580	57.98	0.67	41.35
*Progress Energy Carolinas, Inc. 3,600 502 26,92 4.94 6.65 206.33 19.39 6,711 50.89 0.88	A3	*PacHICorp	3,194	246	19.37	241	3 83	101.20	/6:	3,665	54.28	1.16	44.56
0,08 6,711 50,89 0,88	A3	*Progress Energy Carolinas, Inc.	3.600	205	26 92	707	5.03 20.03	208.32	40.43	7,265	53.53	1.34	45.13
	Global Cradit L	Annual Commence of the Commenc			#V:0£	+C'+	0.03	200.33	19.39	6,711	50.89	0.88	48.23

32.77 44.21 40.94 44.15

0.7 0 1.65

66.53 55.79 57.42 55.85

41.03 39.71 34.74 43.2 43.89 39.32 52.54 56.64 46.59 39.98 50.84 41.99

2.32 3.89 5.18 5.18 4.19 0 0.05 0.05 7.06 2.57

56.65 56.39 60.07 53.93 51.92 60.68 42.74 45.36 52.8 52.8 59.97 49.16 50.96

2003 Actual Data for the Electric Industry (\$mil) Vertically Intergrated Cos. Industry

Tot. Debt % Pref Stk % Common % Tot. Cap Tot. Cap Tot. Cap

46,4 28.84 45.44 46.7 43,87

53.6 71.16 54.07 50.41 55.84 **54.14** 

Sr. Debt Rating	Company	Revenue	Net Income	Operating Margin	EBIT/ Inferest	FFO/ Interest	FFO % Capex	RCF % TD	Total Cap. Ti (In \$mil)
A3 A3	*Public Service Company of Colorado	3,024	228	15.68	3.12	4.51	123.09	11,95	4,612
A3	*Public Service Company of Technology  *Public Service Company of Oklahoma	1.103	3	8.42	2.9	3.77	142.73	15.3	1,063
A3	"Southern California Edison Company	8,854	872	18.03	3,49	5.67	183.72	25.06	9,326
A3	*Southwestern Electric Power Company	1,147	91	13.09	3.21	4.2	168.35	14.73	1,591
	AVERAGE OF RATING GROUP	2,395	212	16.41	3.75	5.27	156.74	18,44	3,662
Baa1	*AEP Texas Central Company	1,748	218	18.4	3.14	2.47	138.62	3.29	3,507
Baa1	*Appalachian Power Company	1,957	199	16.29	3.81	5.6	183.82	21.42	3,233
Baa1	*Artzona Public Service Company	2,105	18	14.16	2.58	4.88	137.46	15.86	4,826
Baa1	*Black Hills Power, Inc.	171	24	29.88	m	4.11	208.13	10.94	388
Baat	*Cincinnati Gas & Electric Company (The)	2,382	299	23.62	4.89	5.86	172.94	19.16	3,657
Baa1	*Empire District Electric Company (The)	326	30	18.87	2.46	3.65	126.19	12.74	804
Baai	*Entergy Arkansas, Inc.	1,590	118	18.7	3.26	6.54	127.92	30.64	2,792
Baa1	*Entergy Louisiana, Inc.	2,166	139	13.96	3.94	17.03	411,08	114.93	2,007
Baa1	"Green Mountain Power Corporation	280	<b>\$</b>	7.28	2.79	3.62	115.28	15.6	198
Baa1	*Hawalian Electric Company, Inc.	1,393	79	8.96	3,95	5.68	141.27	21.1	1,784
Baat	*Ohio Edison Company	2,926	290	18.89	4.89	6.83	349.01	3.19	4,512
Baa1	*Pennsylvania Power Co.	527	35	15.47	5.25	7.11	133.81	22.32	505
Baa1	*Rochester Gas & Electric Corporation	1,025	27	11.79	1,59	4,12	233.77	21.01	1,653
Baa1	*Southwestern Public Service Company	1,201	82	15.15	3.89	4.31	146.09	7.03	1,640
	AVERAGE OF RATING GROUP	1,414	124	16.53	3.53	5.84	187.53	22.8	2,250
Raao	*Claveland Flactric Illumination Company	1.721	190	18.21	1.96	2.94	229.33	12.29	4,335
Raao	*Enterry Mississipni Inc	1,035	94	13.68	2.98	5.84	121.44	26.64	1,294
Raa2	*Fortarrov May Orleans Inc	654	P	4.27	1.57	4.14	84,2	22.62	382
Baa?	"Indiana Michigan Power Company	1.596	06	11,66	2.85	5,12	185.95	22.3	2,495
Baa2	*Indianacolis Power & Light Company	832	143	22,42	6.19	7.31	184,19	16.94	1,410
Baaz	*Kentucky Power Company	416	33	15.55	2.69	4.73	130,69	18.46	908
Baa2	*Pacific Gas & Electric Company	10,438	905	22.41	2.45	3.75	154.24	67.14	9,127
Baa2	*Portland General Flectric Company	1.752	55	7.08	2.2	4.63	171.86	29,09	2,167
Baa2	*Public Service Company of New Mexico	1,455	9	10.11	2.24	5,4	171.23	21.54	2,106
Baa2	*Puget Sound Energy, Inc.	2,150	115	17.16	2.02	2.82	123.04	10.52	3,891
Baa2	*Tampa Electric Company	1,994	123	17.35	3.2	4.36	109.62		3,249
Baa2	*Toledo Edison Company	933	=	2.67	0.59	3.83	140.16	12.11	1,785
	AVERAGE OF RATING GROUP	2,081	149	13.55	2.58	4.57	150.5		2,754
Raga Casa	*Consumers Engrav Company	4 435	194	12.2	2.13	2.22	63.58		6,290
Baa3	*FI Paso Flectric Company	664	72	12.07	1.54	4,09	177.21	25.54	1,131
Baa3	*Enteror Got States Inc.	2.640	20.	11.66	1.96	4.38	136.8		4,141
Baa3	"Great Lakes Power Inc.	377	69	35.98	2.04	က	114.11		2,564
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34,48 41,35 45,66 45,3 52,13 47,26 46,78 48,24 50,37 52,94 57,24 45,64 45,64

0.17 0.72 0.05 0.056 0.4.17 5.01 7.53 2.5 4.28

65.36 57.94 54.34 54.74 47.31 52.74 50.05 49.63 39.54 40.26 44.04 50.08 50.32

% <u>-</u>						
Jommor Tot. Ca	49.26 <b>42.28</b>	66.39 37.76 <b>52.07</b>	57,19 36.59 35.66	16.71 38.54	42.97 <b>42.97</b>	46.21
Pref Stk % ( Tot. Cap	0.47	5.44 2.72	4.62 0 3	- - 6:	1.33 <b>1.33</b>	2.19 0.76
Total Cap. Tot. Debt % Pref Stk % Common % (in \$mil) Tot. Cap Tot. Cap	50.74 <b>57.27</b>	33.61 56.8 <b>45.21</b>	38.2 63.41 61.33	61.56 61.56	55.71 <b>55.71</b>	51.61 51.25
Total Cap. (In \$mil)	1,813 3,188	1,635 1,360	3,210 1,665	1,894	3,456 3,456	3,494
RCF % TD	3.19 10.8	4.69 5.52 <b>5.61</b>	22.79 17.95 11.41 6.82	14.74	11.65 11.65	21.53 17.93
FF0 % Capex	738.28 <b>246</b>	118.72 145.15 , <b>131.94</b>	292.81 160.93 94.56	180.64	180,48 <b>180,48</b>	165.86 145.62
FFO/ Inferest	3.08 3.35	3.31 3.09	4.72 2.89 2.4 2.32	3.08	2.38 <b>2.38</b>	4.93
	Φ. <b>Ի</b> .	က္ကန္း	ဓာဓာဟက	**	0.00	0 60
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2003 Actual Data for the Electric Industry (\$mil) Transmission & Distribution Industry

G. Pott	italismission & Distribution industry			Onerating	CBIT/	<u>(1</u>	750 %		Total Can	Tot. Deht %	Prof Stk %	Common %
Rating	Company	Revenue	Net Income	Margin	Interest	Interest	Сарех	RCF % TD	(ji <b>S</b>		Tot. Cap	Tot. Cap
A1	*AmerenCiPS	742	26	90'9	1.32	2.85	126	-0.41	1,017	47.69	4.92	47.39
A.	*Battimore Gas and Electric Company	2,648	150	14,54	3,41	4.48	134.71	22.65	3,371	49.67	5.64	44.69
A	*Boston Edison Company	1,699	131	13,02	3,34	4.73	196.11	16.93	2,264	63.57	6°,	34.53
¥	*Consolidated Edison Company of New York, Inc.	8.166	591	16.09	3,39	4.17	91.25	14,83	11,379	49.95	1.87	48.18
Ą	*New Finland Power Company	458	72	16.34	16.22	29.03	491.05	30.6	1,425	28.79	0.09	71.12
4	*Grands and Recktond (#ilitias, Inc.	7.07	45	14.03	4.86	6.05	149.3	24.68	989	46.06	0	53.94
₹ ₹	*Con Place Cae & Fleethe Company	231	334	77.77	6.45	9.22	144.37	37.73	2,496	46.19	3.17	50.64
č	AVERAGE OF BATING CROIP	2,393	193	14.55	5.57	8.65	190.40	21.00	3,234.00	47.42	2.51	50.07
		1									٠	
42	*Central Hudson Gas & Flectric Cymoration	581	37	11.95	3.12	5.6	286.27	21,49	299	51.76	3.51	44.73
<b>3</b>	Connecticut I lobt and Power Company	2.705	69	7,41	18.1	4.84	134.91	17,54	2,861	71.52	4.06	24,41
ŧ 2	*thritio One Inc	2,896	283	23.09	2.5	3.38	149.75	1.3	7,245	54.18	3.45	42.38
¥ ¥	*DECO Cases: Company	A 388	468	24.07	3.26	3.99	388	11.82	6,454	84.26	1,35	14.39
Ž.	AVERAGE OF RATING GROUP	2,642	214	18.63	2.67	4,45	239.73	15.06	4,290	65.43	3.09	31.48
					:	1		1	1001	27 47	76.0	32 18
A3	*Attantic City Electric Company	1,236	₩	9.71	1,44	2.7	161,23	Ω. (3	1,00,1		2.0	04.00
2	*Pentral Maine Power Commenc	8	48	16.96	3.92	6.24	326.37	41.63	1,025	32.45	4.0	04,00
2 2	*Commonwealth Edison Company	2.83	702	26.95	3.7	3.84	168,82	12.44	12,782	50.38	0.05	49.56
2 5	Communication Co	1 2 KA	22	Ç	3.39	5,17	156.23	15.09	1,292	53.38	1.68	44.94
2	Deimarya Power & Light Company	45.4	ţ	16.72	3.25	4.32	133.97	14.35	2,460	55.61	3.26	41.13
2	Folomac Electric Fower Company	047.9	576	1 20	4	3.12	201.22	11.22	8,092	68.61	0.99	30.4
A3	Public Service Electric and Gas Company	90,	£.	10.33	200	4.68	167.36	8.7	484	68.57	0	31.43
. A3	Western Massachusetts Electric Company	200 C	2	14.57	76.	4.3	187.89	16.03	3,974	56.64	7:	<del>-</del> 8
		2	:	į								7
Š	A Commence of Adult Commence of the Commence o	SUS	99	19.24	2.87	7.82	484.76	32,6	1,508	_	4.62	35.15
628 1	Cuduesne Light Company	236.6	e e	8.19	2.33	3.68	175.85	4.85	4670		0	67.54
Baal	Jersey Central Power & Light Company	4,50 4,50	3 4	11 37	2.67	er,	408.25	16.96	2,035		0	63.53
Baal	Metropolitan Edison Company	- 100 0	9 20	35.01	2.00	3.23	123.2	15.83	7,082		0	40.33
Baal	Oncor Electric Delivery Company	700,4	200	0	1 10	2 90	178.3	13.18	4,210		1.21	29.03
Baa1	PPL Electric Utilities Corporation	00/7	3 6	o de			172.17	6.36	1,940		0	66.86
Baat	Pennsylvania Electric Company	- 16	07	0.45	, c.	7.53	100,17	33.73	583	34.54	0	65.46
Baa1	Tunion Light, Heat & Power Company (The)	1 478	7.	12.67	2.63	£.	234.67	17.8	3,105			52,56
	AVERAGE OF RAING GROOT	į.						i	•		•	730
Caso	*Contentaint Energy Manaton Flactric 11 C	2.124	432	84	2.82	4.09	497.06	31.84	6,243	. 00°.	9	46.26
2992	*Now York Chate Electric and Gas Computing	1,876	143	16.14	3.82	4.77	310.03	16.13	2,080		70°C	42.41
7887	**************************************	4 084	135	10.87	1.98	2.77	163.01	14,47	7,8/6		0.04	AA 10
<b>P</b> 882	AVERAGE OF BATING CAPILD	268	752	<b>123</b>	2.87	3.87	323.37	19,82	5,400	_	<u> </u>	ţ
								•	Č		c	40.38
Bat	*Potomac Edison Company (The)	906	4	7.87	2.27	3.06	120,35	8.23	778	20.02		50.88
Ra1	*West Penn Power Company	1,134	92	13.45	3.84	4.2	353.1	10.31	300'-	_	) <b>c</b>	50.03
Ī	AVERAGE OF RATHE CROIP	1,020	28	10.66	3.06	3.63	238.72	12.27	F)			21.00
		4						***************************************				

200			E										
	N. S. Loring any Co.	Кеуепие	Net Income	Operating Margin	EBIT/ Interest	FF0/ Interest	FFO %	RCF % TD	Total Cap.	Tot. Debt % Tot Can	Pref Stk %	ap. Tot. Debt % Pref Stk % Common %	
HAZ	Tayle 800 to the Control of the second	47.0							,	deo aos	of. cap	or. Cap	
	AVERAGE OF PATING GROUP	248 249	% <b>%</b>	26.38 <b>26.38</b>	2.28 <b>2.28</b>	3.51	174.36	10.21	670	63.27	0	36.73	
	TOTAL AVERAGES	2140	# *		;				20	77:00	-	36.73	
	TOTAL MEDIANS		<u>8</u>	5 5 5	e. 9	S. 5	221.53	17.41	3,486	53.07	1.51	45.41	
· Global C	Charles Court Branch Comment C					4.60	70.001	30.00	2,080	53.25	0.84	7.4	

\* Global Gredit Report Companies

\* Global Credit Report Companies

2003 Actual Data for the Electric Industry (\$mil) Holding Cos. Industry

	Holaing	Holding Cos, Industry			;			,		Tabel Con	Table 0	Dred Ctt of	Common %
	Sr. Debt Rating	Company	Revenue	Net Income	Operating Margin	Interest	FFO/ Interest	Capex	RCF % TD	(in \$mil)	Tot. Cap		Tot. Cap
	A	*WPS Resources Corporation	4,321	102	3.02	2.35	5.22	133.2	15.7	2,072	49.12	2.47	48.41
		AVERAGE OF RATING GROUP	4,321	102	3,02	2.35	277	133.2	19.7	2/0/2	71.8¢	***	r S
	•		7000	205	12.81	2 82	4.72	102.93	13.93	13,736	51,38	1.55	47.07
	2:	Consolidated Edison, Mc.	20,8	208	4 4 4	A DA	7.32	167.06	19.67	16,982	58.94	0.03	41.03
	2	Tryl Group, Inc.	9,00°C	183	11 53	277	4.24	173.94	17.36	3,816	63.19	1.13	35.68
	¥:	TAIN.	453	30	9.45	3.98	6.08	178.91	20.28	654	46.6	2.37	51.03
	¥	Ottor Itali Corporation  AVERAGE OF RATING GROUP	5,781	410	12.42	3.4	5.48	155.71	17.81	8,797	55.03	1.27	43.7
			•	5	22 72	7 04	4 73	146.52	13.17	9,308	50.81	2.18	47.01
	<b>A</b> 3	*Ameren Corporation	520,4	990	25.73	45.0	100	127.49	11.25	37,535	58,48	0.36	41.16
	A3	*Duke Energy Corporation	676,22	008-	14.67	2.37	88.4	117.36	14.88	10,350	58.89	0.81	40.3
	A3	*KeySpan Corporation	6,913	704	10.41	9.6	3.0	105.32	14.45	7.265	53.53	1,34	45.13
	₩	*PacifiCorp	3,194	240	18.57 45.43	2,4	27.5	73.31	10.57	6,043	59.94	1.9	38.16
	A3	*SCANA Corporation	3,416	797	10,13	2.3	8.93	153.9	17.98	23,444	48.94	9.91	41.15
	A3	*Southern Company (The)	11,251	1,448	25.73 43.50	2.5	4.97	103.4	4.43	6,740	64.56	0.45	34,99
	A3	Wisconsin Energy Corporation	400.4	£ 8	15.76	283	4.54	118.08	13.82	14,384	56.45	2.42	41.13
• )		AVERAGE OF RAILING ONCOF	2					0	40 07	9000	75 A7	<b>c</b>	63.53
dv	Dag	*AllETE Inc	1,619	143	18.63	4.53	3.94	108.05	27.27	062'7	100.4	193	43.25
iii	0000	*Constellation Energy Group Inc.	9,703	476	10.72	3.05	11.55	546.47	03.33	3,030	52 13	0.88	36
•	Dog	*Onatolica Beenings and pro-	12,078	949	21.2	3.02	4.31	81.65	10.73	4000	54.7	2.59	42.7
	Dag		823	47	10.21	1.37	4.98	164.02	16.25	470'7	- 7.40	1 73	13 40
	6431	DACORY, III.	A 059	121	7.14	1.76	3.75	123.35	13.69	79/0	0,40		41.53
	Haa 1	Mormeast unities	077.0	136	8 13	3.12	5.24	230.5	18.8/	7,694	75,00	2 5	4 51
	Baa1	*OGE Energy Corp.	2,73	202 208	11 91	3.05	5.37	128.22	21.46	9,371	56.58	. F. C	10.14
	Baa1	*Sempra Energy	/00'/	200	12.67	2.53	4.56	154.01	18.2	12,009	56.1	\R.O.	45.02
	Beat	*Xeel Energy Inc.	6.237	<b>3</b>	12.7	28	5.46	192.03	21.87	8,309	55.63	1.24	2.5 2.5
		AVERAGE OF TALING GROOT	5		1	,	Š	140.04	9 07	1 287		3.11	37.14
	Dog	-CII CORP Inc	606	19	9.35	9: 7	18.2	50.04	11.08	90.0		0.69	40,73
	2000	*Charm Com	4,416	434	18.31	3.01	4 4	128.33	00.11 04.0	13 050		2.07	38.99
	Baas	*htt Energy Company	7,041	389	10.61	1.37	2.61	017.10	10.40	7.022		1,64	36.63
	Ran	*Fourty Fast Corporation	4,594	207	14.15	2.28	100 r	406.00	10.00	04.350		0.36	34.92
	2007	*Evelon Comonation	15,812	793	13.9	2.49	5,12	00.00	- 121	2 430		1.6	39,39
	Dead Const	*Great Plains Financy Incomposated	2,149	160	14.33	4.05	29.6	240.33	0t'21	2388		9.82	44.17
	Raa	*Hawaiian Electric Industries, Inc.	1,781	118	14.8	EC. (1)	2 6	103.01	A 86	975.0		1.15	32.02
	Baa2	*Pepco Holdings, inc.	7,271	108	æ. i	80°C	2007	108.55	17.47	6.239	54.64	0	45,36
	Bas2	*Pinnacle West Capital Corporation	2,818	231	=	2,30	PO' <b>+</b>	200					

\* Global Credit Report Companies Includes diversified holding companies

Jommon % Tot. Cap	40.58 28.24 46.13 <b>38.69</b>	35.09 38.9 44.13 64.24 34.22 29.38 51 40.07 16.78	14.98 -8.58 27.7 39.88 29.93 30.79 <b>22.45</b>	27.35 27.35	23.34	20.87 33.44 17.94 26.94 <b>24.79</b>	38.71 39.19		
Pref Stk % ( Tot. Cap	0.51 0.41 0.78	0.61 1.54 0.51 2.49 4.59 0.64 1.7 0.56	0 0.43 0.05 3.84 0.65	10.57 <b>10.57</b>	7.85 7.83	1.03 0.33 0.94 1.31	2.06		
Total Cap, Tot. Debt % Pref Stk % Common % (in \$mil) Tot. Cap Tot. Cap Tot. Cap	58.91 71.35 53.87 <b>59.53</b>	64.3 59.56 55.36 33.27 61.2 69.98 46.92 58.23 82.66	85.02 104.41 71.87 66.23 66.23 76.03	62.08 <b>62.08</b>	28.41 79.06 <b>68.73</b>	78.12 66.56 78.76 72.12 <b>73.89</b>	61.23 59.28		
Total Cap. T	18,343 19,581 1,068 9,594	22,438 1,931 1,601 1,601 1,682 20,080 17,066 20,689 16,575 11,424	12,948 1,420 -11,960 -4,179 19,776 3,298 8,830	6,141 6,141	10,512 1,025 <b>5,768</b>	7,329 4,065 9,244 5,329 <b>6,492</b>	9,770 7,297		
\$ 5	0.75 1.42 7.32 3.14	7.42 2.24 24.1 9.82 19.65 19.65 1.88 9.43	14.54 8.25 13.91 10.79 11.71 10.23	0.91 <b>0.91</b>	8.83 <b>8.83</b>	3.59 -7.69 4.24 10.99	13.83 13.43	 	
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# Global Power Companies by Rating Category\*[1] September 17, 2004

Company Name	Rating	Company Name	Ratin
	Aaa	Tohoku Electric Power Company, Inc.	A1
Landsvirkjun Minicentrales Dos, S. Com. p.A.	Aaa	WPS Resources Corporation	A1
Minicentrales bos, S. com. p.a. Tennessee Valley Authority	Aaa	Wisconsin Power and Light Company	A1
	Aa1	Arkansas Electric Cooperative Corporation	<b>A</b> 2
CLP Power Hong Kong Financing Limited	Mai	Associated Electric Cooperative, Inc.	A2
	Aa2	Basin Electric Power Cooperative	A2
British Columbia Hydro & Power Authority	Aa2	Buckeye Power, Inc.	A2
CLP Holdings Limited	Aa2	Central Hudson Gas & Electric Corporation	A2
Madison Gas and Electric Company	Aa2	Central Illinois Light Company	A2
Ontario Hydro	Aa2	Connecticut Light and Power Company	A2
Transpower New Zealand Limited	Aa2 Aa2	Consolidated Edison, Inc.	A2
Wisconsin Public Service Corporation	Maz	Dairyland Power Cooperative	A2
	Aa3	EDF Energy Networks (EPN) pic	A2
Cogentrix Energy, Inc.	Aa3	EDF Energy Networks (LPN) plc	A2
E.ON AG	Aa3 Aa3	Essent N.V.	A2
EVN AG	Aa3 Aa3	Essent Nederland B.V.	A2
Electrabel SA_	Aa3 Aa3	FPL Group Capital Inc	A2
Electricite de France	Aa3 Aa3	FPL Group, Inc.	A2
Fingrid Oyj	Aa3 Aa3	Hydro One Inc.	A2
Florida Power & Light Company	Aa3 Aa3	Iberdrola S.A.	A2
Kansai Electric Power Co., Inc.		Idaho Power Company	A2
Mississippi Power Company	Aa3	Kansas City Power & Light Company	A2
New Brunswick Power Corp.	Aa3	Louisville Gas & Electric Company	A2
Scottish Hydro-Electric Power Distribution	Aa3	NSTAR	A2
Scottish Hydro-Electric Transmission Ltd	Aa3	National Cooperative Services Corporation	A2
Scottish and Southern Energy plc	Aa3	National Grid Company plc	A2
Southern Electric Power Distribution plc	Aa3	Northern States Power Company (Minnesota)	A2
Statnett SF	Aa3	Northern States Power Company (Wisconsin)	A2
Tokyo Electric Power Company, Inc.	Aa3	Nuon N.V.	A2
Wisconsin Electric Power Company	Aa3	Oklahoma Gas & Electric Company	A2
		Otter Tail Corporation	A2
Alabama Power Company	A1	PECO Energy Company	A2
AmerenCIPS	A1	Red Electrica de Espana	A2
AmerenUE	A1	SP Distribution Ltd	A2
American Transmission Company LLC	A1	SP Manweb pic	A2
Baltimore Gas and Electric Company	A1	SP Transmission Ltd	A2
Boston Edison Company	A1	SSE Generation Ltd	A2
CLP Power Hong Kong Limited	A1	Southern Elect Generating Co	A2
Chugoku Electric Power Co., Inc.	A1	United Utilities Electricity Pic	A2
Consolidated Edison Company of New York,	A1	Virginia Electric and Power Company	A2
ENEL S.p.A.	A1	Asidens Electric and Lower combany	74
Georgia Power Company	A1	AEP Texas North Company	A3
Gulf Power Company	A1	America Corporation	A3
Hokkaido Electric Power Co., Inc.	A1	Ameren Corporation AmerenEnergy Generating Company	A3
Hokuriku Electric Power Co., Inc.	A1	Attantic City Electric Company	A3
Hydro-Quebec	A1		A3
Kentucky Utilities Co.	A1	Central Maine Power Company Central Networks East plc	A3
Kvushu Electric Power Company, Inc.	A1	Cleco Power LLC	A3
Massachusetts Electric Company	A1	Columbus Southern Power Company	A3
Narragansett Electric Company	<b>A</b> 1		A3
National Rural Utilities Coop. Finance Corp.	A1	Commonwealth Edison Company	A3
New England Power Company	A1	Delmarva Power & Light Company	
Oesterreichische Elektrizitaetswirtschaf	A1	Detroit Edison Company (The)	. A3
Orange and Rockland Utilities, Inc.	A1	Duke Energy Corporation	A3
Progress Energy Florida, Inc.	A1	E.ON UK plc	A3
Rockland Electric Company	A1	EDF Energy (South East) plc	A3
San Diego Gas & Electric Company	A1	EDF Energy Networks (SPN) pic	A3
San Diego Gas & Electric Company Savannah Electric and Power Company	A1	EDF Energy pic	A3
Savannan Electric Satur Formation Company	A1	EDP Finance B.V.	A3
Shikoku Electric Power Company, Inc. South Carolina Electric & Gas Company	A1	ETSA Utilities	A3

<sup>\*</sup> Ratings shown are the senior-most for each issuer. [1] Includes holding companies

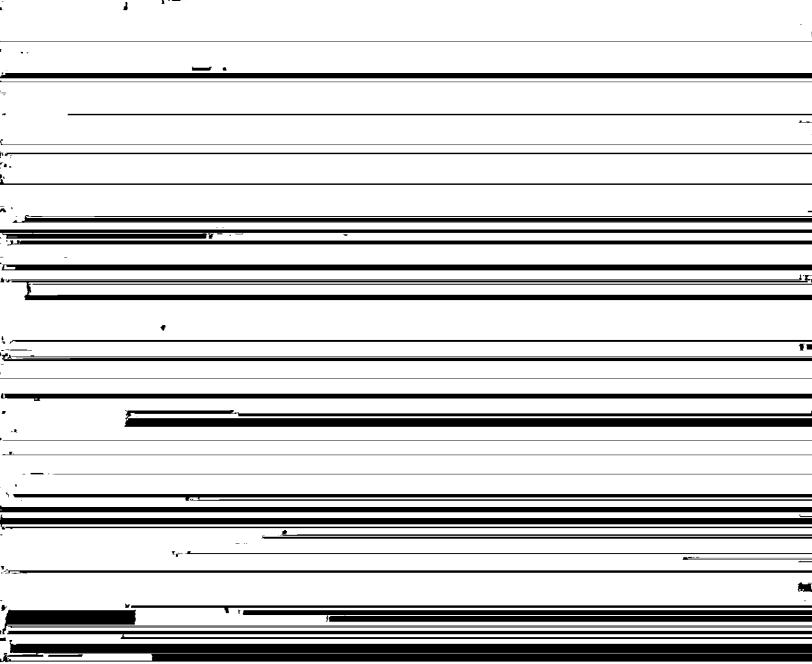
### Global Power Companies by Rating Category\*[1] September 17, 2004

Company Name	Rating	Company Name	Rating
Eesti Energia AS	A3	Hawaiian Electric Company, Inc.	Baa1
Electricidade de Portugal, S.A.	<b>A</b> 3	Hidroelectrica del Cantabrico, S.A.	Baa1
Eskom Holdings Ltd	A3	IDACORP, Inc.	Baa1
Florida Progress Corporation	A3	International Endesa B.V.	Baa1
Interstate Power and Light Company	A3	Interstate Power Company	Baa1
KeySpan Generation LLC	<b>A</b> 3	Jersey Central Power & Light Company	Baa1
Korea Electric Power Corporation	A3	Metropolitan Edison Company	Baa1
Korea Hydro and Nuclear Power Company Limited	<b>A</b> 3	MidAmerican Funding, LLC	Baa1
LG&E Energy LLC	A3	National Grid Holdings One plc	Baa1
London Energy plc	A3	National Grid Transco Pic	Baa1
MidAmerican Energy Company	A3	Northeast Utilities	Baa1
Nuon Power Generation BV	<b>A</b> 3	Northern Electric Distribution Ltd	Baa1
Ohio Power Company	A3	OGE Energy Corp.	Baa1
Old Dominion Electric Cooperative	<b>A</b> 3	Oglethorpe Power Corporation	Baa1
SI Energy, Inc.	A3	Ohio Edison Company	Baa1
PacifiCorp	A3	Oncor Electric Delivery Company	Baa1
otomac Electric Power Company	A3	PPL Electric Utilities Corporation	Baa1
owergen (East Midlands) Investments	A3	PSEG Power L.L.C.	Baa1
owergen Ltd	A3	Public Power Corporation S.A.	Baa1
owergen US Holdings Ltd	A3	Pennsylvania Electric Company	Baa1
rogress Capital Holdings, Inc.	A3	Pennsylvania Power Co.	Baa1
rogress Energy Carolinas, Inc. ublic Service Company of Colorado	A3	RWE npower plc	Baa1
ublic Service Company of Colorado  ublic Service Company of New Hampshire	A3 A3	Rochester Gas & Electric Corporation	Baa1
ublic Service Company of Oklahoma	A3	Scottish Power Generation Ltd Scottish Power UK Holdings Ltd.	Baa1
ublic Service Electric and Gas Company	A3	Scottish Power pic	Baa1
CANA Corporation	A3	Sempra Energy	Baa1
EEBOARD Energy Ltd	Ã3	Southern Power Company	Baa1 Baa1
SE Energy Supply Ltd	Ã3	Southwestern Public Service Company	Baa1
cottish Power Investments Itd	A3	Union Light, Heat & Power Company (The)	Baa1
cottish Power UK plc	A3	UnitedNetworks Ltd.	Baa1
outhern California Edison Company	A3	Utility Contract Funding, LLC.	Baa1
outhern Company (The)	A3	Western Power Distribution (South Wales)	Baa1
purthwestern Electric Power Company	<b>A</b> 3	Western Power Distribution (South West)	Baa1
ware Butte Electric Cooperative	A3 -	Xcel Energy Inc.	Baa1
(V. Aŭstralia Holdings (Ptnrshp) Ltd. Pt	<b>A</b> 3	Yorkshire Electricity Distribution pic	Baa1
W Electricity Limited	<b>A</b> 3	•	
itted Utilities PLC	<b>A</b> 3	AEP Generating Company	Baa2
illentali AB	<b>A</b> 3	CILCORP Inc.	Baa2
estern Massachusetts Electric Company	A3	CenterPoint Energy Houston Electric, LLC	Baa2
Scorsin Energy Capital Corporation	A3	Cinergy Corp.	Baa2
Scorsin Energy Corporation	<b>A</b> 3	Cleveland Electric Illuminating Company	Baa2
		Conectiv	Baa2
accas Central Company	Baal	DTE Energy Company	Baa2
Machian Power Company	Baai	ESI Tractebel Funding Corporation	Baa2
Pagaritan Power Company  Company	Baa1	El Habal Funding Trust	Baa2
Stills Power, inc.	Baa1	Energy East Corporation	Baa2
en rans rower, arc.	Baa1	Entergy Mississippi, Inc.	Baa2
11 au Gas & Electric Company (The)	Baa1	Entergy New Orleans, Inc.	Baa2
Selfaion Energy Group, Inc.	Baa1	Exelon Corporation	Baa2
Resources inc.	Baa1	Fideicomiso Petacalco	Baa2
Light Company	Baal	Great Plains Energy Incorporated	Baa2
Strict Electric Company (The)	Baa1 Baa1	Hawaiian Electric Industries, Inc.	Baa2
	Baa1	Hoosier Energy Rural Electric Cooperativ	Baa2
to tansas, Inc.	Baa1	Indiana Michigan Power Company	Baa2
Pu Bulsiana, Inc.	Baa1	Indianapolis Power & Light Company	Baa2
Company, LLC	Baa1	Israel Electric Corporation Limited (The)	Baa2
2 arsmission Corporation	Baa1	Kentucky Power Company	Baa2
Corporation State of Corporation	Baa1	Monterrey Power, S.A. de C.V.	Baa2
ower corporation	Baa1	New York State Electric and Gas Corporation	Baa2

Tare the senior-most for each issuer.

# Global Power Companies by Rating Category\*[1] September 17, 2004

Company Name	Rating	Company Name	Rating
Niagara Mohawk Power Corporation	Baa2	Tenaska Georgia Partners, L.P.	Baa3
North Jersey Energy Associates	Baa2		Baa3
Northeast Energy Associates	Baa2	Vermont Electric Cooperative, Inc.	Baa3
Northern Electric pic	Baa2	·	
	Baa2	AES Eastern Energy, L.P.	Ba1
PPL Energy Supply, LLC	Baa2	Brooklyn Navy Yard Cogeneration Partners	Ba1
Pacific Gas & Electric Company	Baa2	CE Generation LLC.	Ba1
Pepco Holdings, Inc.	Baa2	Caithness Coso Funding Corp.	Ba1
Pinnacle West Capital Corporation	Raa?	CenterPoint Fnerov. Inc.	Bat

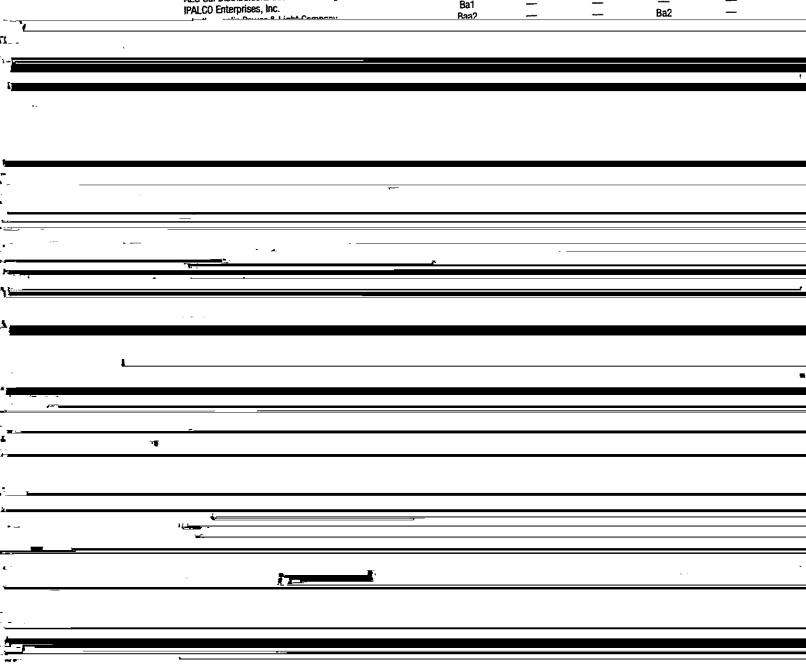


## Global Power Companies by Rating Category\*[1] September 17, 2004

Company Name	Rating	Company Name	Rating
AES Red Oak, L.L.C.	82	Cleco Evangeline LLC	B3
Allegheny Energy, Inc.	B2	Mission Energy Holding Company	B3
Aquila, Inc.	B2	Paiton Energy Funding B.V.	B3
CE Casecnan Water and Energy Company, In	82	Quezon Power (Philippines), Limited Co.	B3
CMS Energy Corporation	B2		
Calpine Corporation	<b>B</b> 2	Cedar Brakes I, L.L.C.	Caa1
Espirito Santo Centrais Eletricas - ESCE	B2	Cedar Brakes II, L.L.C.	Caa1
LSP Energy Limited Partnership	B2		
Orion Power Holdings, Inc.	B2	TXU Europe Group plc	Caa2
RockGen Energy LLC	B2	, TXU Europe Ltd.	Caa2
Sierra Pacific Resources	82	Tiete Certificates Grantor Trust	Caa2
South Point Energy Center, LLC	B2		
manner and men \$1 and and		British Energy plc	Caa3
Allegheny Generating Company	<b>B</b> 3	••	
Avon Energy Partners Holdings	B3	AES Sul Distribuldora Gaucha de Energia	Ca

### Global Power Rating List by Operating Relationship

As of September 17, 2004	Senior Secured	Senior Unsecured	Subord.	Preferred Stock	Commercial Paper
The Committee (The)	Ba3	<b>B</b> 2	B3***	(P)Caa2	
AES Corporation, (The) AES China Generating Co. Ltd.		<b>B</b> 2			<del></del>
AES China Generating Co. Ltd.	Bat				
AES Eastern Energy, L.P.		Ba3	-		
AES Gener S.A. Empresa Electrica Guacolda S.A.	Baa3		-		
Empresa electrica duactora out.	B2				
AES Ironwood, LLC.	Baa3		-		****
AES Puerto Rico, L.P.	B2			*****	
AES Red Oak, L.L.C. AES Sul Distribuidora Gaucha de Energia S.A.	Ca		_	******	-
IPALCO Enterprises, Inc.	Ba1	_			
PALCO Biterprises, sk.	Raa2			Ba2	



FES Coke Battery Company, Inc.

	Senior Secured	Senior Unsecured	Subord.	Preferred Stock	Commercial Paper
Central Vermont Public Service Corp.			_	Ba2	_
Chugoku Electric Power Co., Inc.	A1				
Cinergy Corp.		Baa2	(P)Baa3	(P)Ba1	-
- Cincinnati-Gas & Electric-Company (The)	- (P)A3	Baa1	—	Baa3	P-2
PSI Energy, Inc.	Å3	Baa1		Baa3	P-2
Union Light, Heat & Power Company (The)		Baa1			<del></del>
Cleco Corporation		Baa3	(P)Ba1	(P)Ba2	
Cleco Evangeline LLC	<b>B</b> 3				·
Cleco Power LLC	<b>A</b> 3	Baa1		Baa3	<u></u>
Companhia Energetica de Brasilia - CEB		Ba3		*****	
Consolidated Edison, Inc.	'	<b>A</b> 2	(P)A3	(P)Baa1	P-1
Consolidated Edison Company of New York, Inc.		Aaa	A2		P-1
Orange and Rockdand Utilities, Inc.	_	A1	(P)A2		P-1
Rockland Electric Company	A1	_		*****	
Constellation Energy Group, Inc.		Baa1		(P)Baa2	P-2
Baltimore Gas and Electric Company	<b>A</b> 1	<b>A2</b>	_	Baa1	P-1
DPL Inc.		Ba3	*****		NP
Parker Persons B I inhit Commons	Bans			R22	מָנוּן



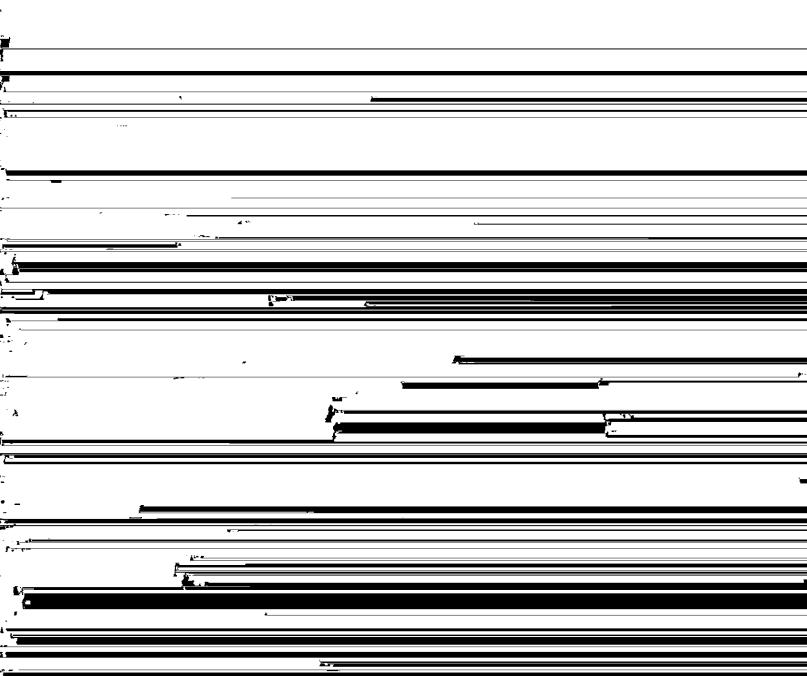
Ba3

, 5 01 5 4 5 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Senior Secured	Senior Unsecured	Subord.	Preferred Stock	Commercia Paper
New York State Electric and Gas Corporation		Baa2		Ba1	P-2
Market Bras & Flankin Commention	Don1	/DNDnn9		(P\Ra1	

Enersis S.A.		Ba2		-	-
Empresa Nacional de Electricidad, S.A.(Chile)		Ba2			******
Enron Corp.	*****			-	_
Portland General Electric Company	Baa2	Baa3		Ba2	P-3
Entergy Corporation					
Entergy Arkansas, Inc.	Baa1	(P)Baa2		Ba1	
Entergy Gulf States, Inc.	Baa3	• • • • • • • • • • • • • • • • • • • •	-terrener	Ba3	
Entergy Louisiana, Inc.	Baa1	Baa2		Ba1	
Entergy Mississippi, Inc.	Baa2	(P)Baa3	_	Ba2	
Entergy New Orleans, Inc.	Baa2	` -	_	Ba2	
System Energy Resources, Inc.	Baa3	(P)Ba1	********		
Eskom Holdings Ltd	with	A3			
Essent N.V.	*****	A2	_	_	P-1
Essent Nederland B.V.	_	A2	*****		P-1
Exelon Corporation		Baa2	(P)Baa3	(P)Ba1	P-2
Exelon Generation Company, LLC	_	Baa1			P-2
PECO Energy Company	A2	•	(P)B8a2	Baa2	P-1
Commonwealth Edison Company	A3	Baa1		Baa3	P-2
FPL Group, Inc.	_	******	_		
Florida Power & Light Company	Aa3	A1		<b>A3</b>	P-1
Fingrid Oyj	-	Aa3	<b>A</b> 1		P-1
FirstEnergy Corp.	_	Baa3	<del></del> .		
Cleveland Electric Illuminating Company	8aa2	Baa3	_	Ba2	*
Jersey Central Power & Light Company	Baa1	****		Ba1	
Metropolitan Edison Company	Baa1	Baa2	***	(P)Ba1	
Pennsylvania Electric Company	Baa1	Baa2	_		<del></del>
Ohio Edison Company	Baa1	Baa2		Ba1	mmar-
Pennsylvania Power Co.	Baa1			Ba1	
Toledo Edison Company	Baa2	<del></del>	*****	Ba2	
Georgia Transmission Corporation	_				P-2
Great Lakes Power Inc.	_	Baa3		D	P-3
Great Plains Energy Incorporated		Baa2	(P)Baa3	Ba1	
Kansas City Power & Light Company	A2	<b>A</b> 3	(P)Baa1		P-2
Green Mountain Power Corporation	Baa1	D0		Ba1	
Hawaiian Electric Industries, Inc.		Baa2		-	<del>-</del>
Hidroelectrica del Cantabrico, S.A.		-	_		P-2
Hokkaido Electric Power Co., Inc.	A1		_	******	P-1
Hekuriku Electric Power Co., Inc.	A1	A2	*******		P-1 P-1
Hydro One Inc.	*****	A2 A1		<del></del>	r- 1
Hydro-Quebec		At Baa1	_		P-2
IDACORP, Inc.	ÃO.			Baa2	
Idaho Power Company	A2	(P)A3		DddZ	P-1
Iberdrola S.A.	_	A2			P-1
InterGen N.V.	D2				
Quezon Power (Philippines), Limited Co.	B3	D7			
Israel Electric Corporation Limited (The)		Baa2			<del></del>
Juniper Generation, LLC.	Ba3		-		
Kansai Electric Power Co., Inc.	Aa3		*****	*******	
Korea Electric Power Corporation		A3		<del></del>	
Korea Hydro and Nuclear Power Company Limited		A3	*****		<del></del>
Kvushu Electric Power Company, Inc.	<b>A</b> 1	****			

	Senior Secured	Senior Unsecured	Subord.	Preferred Stock	Commerci Paper
Yorkshire Electric Distribution Ltd.		Baa1		***	
CE Generation LLC.	Ba1				
Salton Sea Funding Corporation	Ba1	<u></u>		*****	-
MidAmerican Funding, LLC	Baa1	Baa1		-	-
MidAmerican Energy Company	****	A3	(P)Baa1	Baa2	P-1
ISTAR		A2	.,,		P-1
Boston Edison Company		A1	*****	A3	P-1
ational Grid Transco Pic		Baa1	400		P-2
National Grid Holdings One pic			***		1 An-
National Grid Company pic		A2			P-1
		nc.			1-1
National Grid USA	A1				P-1
Massachusetts Electric Company	A1			Pop 1	
Narragansett Electric Company	Ai			Baa1	
New England Power Company		D0	*******	Baa1	P-1
Niagara Mohawk Power Corporation	Baa2	Baa3		Ba2	<del></del>
ational Rural Utilities Coop, Finance Corp.	<b>A</b> 1	A2	<b>A</b> 3	4	P-1
ational Thermal Power Corporation	-	NR	*******	_	
ortheast Utilities		Baa1			
Connecticut Light and Power Company	<b>A</b> 2	******		Baa2	
Northeast Generation Company	Baa2	1—			*****
Public Service Company of New Hampshire	<b>A</b> 3	*****	********	_	
Western Massachusetts Electric Company		<b>A</b> 3	_		*****
ion N.V.		-			P-1
Nuon Finance B.V.	_	A2	*****		-
GE Energy Corp.		Baa1	Baa2	_	P-2
Oklahoma Gas & Electric Company		A2			P-1
esterreichische Elektrizitaetswirtschafts-AG	-	A1	****		
plethorpe Power Corporation	_		***		P-2
	A3	_			
d Dominion Electric Cooperative	~	A2		(P)Baa1	
ter Tail Corporation		PAZ.		(F)Data i	
G&E Corporation	Baa2	(P)Baa3		Ba2	
Pacific Gas & Electric Company	Daaz	(r)Daas		(P)Ba1	
L Corporation		Baa3	<del></del>	(F)Dd i	
PPL Capital Funding, Inc.				Ba1	P-2
PPL Electric Utilities Corporation	Baa1	Baa2	<u></u>	bai	P-2
PPL Energy Supply, LLC		Baa2	-	*****	*****
Western Power Distribution Holdings Limited	<del></del>	Bas2		_	
Western Power Distribution LLP	-	Baa2	NR		
:Western Power Distribution (South Wale)		Baa1	<del></del>		
Western Power Distribution (South West)		Baa1			P-2
PPL Montana, LLC	Baa3				
blic Power Corporation S.A.		Baa1	_		-
beo Holdings, Inc.		Baa2	****		P-2
Sonectiv		Baa2			
Attantic Energy, Inc.			_	_	
Atlantic City Flectric Company	A3	Baa1		Baa3	P-2
Delmarva Power & Light Company	A3	Baa1		Baa3	P-2
Mornac Electric Power Company	A3	Baa1		Baa3	P-2
Polipriac Capital Investment Corporation		Baa2		_	
Tacle West Capital Corporation		Baa2	(P)Baa3	(P)Ba1	P-2
	<del>_</del>	_	(P)Baa2	(i jua i	P-2
Profia Public Service Company	_	Baa1	(F)Daaz		
ergen Ltd		40	41	natural re-	P-2
DELIK pic	*****	A3			P-2
Rovergen (East Midlands) Investments		<b>A</b> 3		-	P-2
Dentral Networks East plc	_	<del></del>			P-2
Margen US Holdings Ltd		_	+		P-2
LE ENERGY LLC		<del></del>	-	_	
Semicky Milities Co	<b>A</b> 1	_	_		P-1
Capital Corp.	* * * *	<b>A</b> 3		····	P-2
Desville Gas & Electric Company		, <del></del>		Baa1	
A resolution of the control of the c	<del></del>	Dne?			P-2
CENTER CTUY, D.C.	4	Baa2	*****	(P)Ba1	r-4

As of September 17, 2004	Senior Secured	Senior Unsecured	Subord.	Preferred Stock	Commercia Paper
Progress Capital Holdings, Inc. Progress Energy Florida, Inc. Progress Energy Carolinas, Inc. Public Service Company of New Mexico	A1 A3	A3 A2 Baa1 Baa2 Raa2	(P)A3 Baa2 — (P)Baa3	Baa1 Baa3 Ba1 Baa3	P-1 P-2 P-2 P-2
l-					

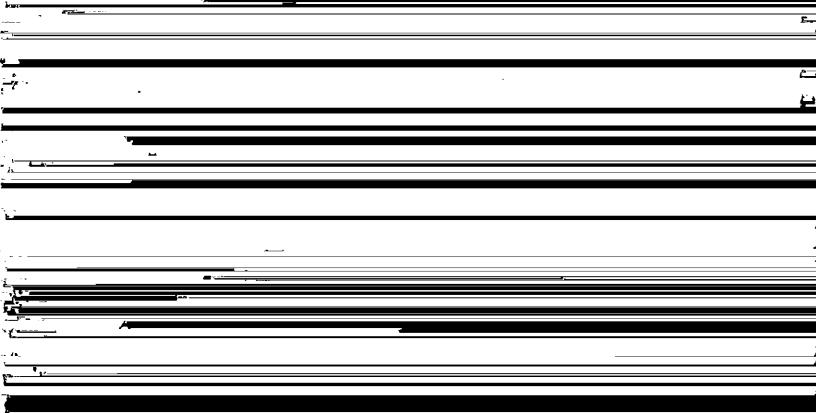


	75 of September 17, 2004	Senior Secured	Senior Unsecured	Subord.	Preferred Stock	Commercial Paper
	Transpower New Zealand Limited	fleet	Aa2		******	P-1
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	Union Fenosa S.A. United Utilities PLC	_	— A3			P-2 P-2
	United Utilities Electricity Plc	-	A2			P-1
	Utility Contract Funding, L.L.C.	Baa1	— A3	 Pact		
	Vattenfall AB Vermont Electric Cooperative, Inc.	Baa3		Baa1		<del></del>
	WPS Resources Corporation		<b>A</b> 1	(P)A2		P-1
	Wisconsin Public Service Corporation	Aa2	Aa3		A2	P-1
	Westar Energy, Inc.	Ba1	Ba2		B1	****
	Kansas Gas & Electric Co.	Ba1	A3			<del></del>
	Wisconsin Energy Corporation Wisconsin Electric Power Company	 Aa3	A3 A1	_	A3	— P-1
	Xcel Energy Inc.	_	Baa1		Baa3	<del></del>
:	Northern States Power Company (Minnesota)	A2	<b>A</b> 3			P-2
:	Northern States Power Company (Wisconsin)	A2	<b>A</b> 3			<del></del>
\$ 1	Public Service Company of Colorado	A3	Baa1 Baa1	(P)Baa2	(P)Baa3	P-2
# P	Southwestern Public Service Company		छवव ।		(P)Baa3	P-2
- E	* Secured lease obligation bonds ** Lease obligation bonds				,	

<sup>&</sup>quot; Lease obligation bonds Senior subordinated

## Global Power Issuer Ratings September 17, 2004

Company Name	Rating	Company Name	Rating
	Baa2	Entergy Mississippi, Inc.	Baa3
AEP Texas Central Company	Baa1	Entergy New Orleans, Inc.	Baa3
AEP Texas North Company	Baa2	Exelon Corporation	Baa2
ALLETE, Inc.	A2	Exelon Generation Company, LLC	Baa1
Alabama Power Company	83	FirstEnergy Corp.	Baa3
Allegheny Energy Supply Company, LLC	A3	Florida Power & Light Company	A1
Ameren Corporation		Georgia Power Company	A2
AmerenCIPS	A2	Georgia Transmission Corporation	Baa1
AmerenUE	A2	Gulf Power Company	<b>A2</b>
American Transmission Company LLC	A1	Hawaiian Electric Company, Inc.	Baa1
Appalachian Power Company	Baa2	Hidroelectrica del Cantabrico, S.A.	Baa1
Aguila, Inc.	B2	Hoosier Energy Rural Electric Cooperative Inc	Baa2
Arizona Public Service Company	Baa1	IDACORP, Inc.	Baa1
Associated Electric Cooperative, Inc.	_A2	IPALCO Enterprises, Inc.	Ba2
Atlantic City Electric Company	Baa1	Idaho Power Company	A3
Avista Corp.	Ba1	Illinois Power Company	B1
Baltimore Gas and Electric Company	A2	Indiana Michigan Power Company	Baa2
Basin Electric Power Cooperative	A2	Indianapolis Power & Light Company	Baa3
Black Hills Corporation	Baa3	International Power plc	B1
Black Hills Power, Inc.	Baa2	Interstate Power Company	Baa1
Boston Edison Company	A1	Interstate Power and Light Company	Baa1
Buckeye Power, Inc.	A2	Jersey Central Power & Light Company	Baa2
CLP Holdings Limited	Aa2	Kansai Electric Power Co., Inc.	Aa3
CLP Power Hong Kong Limited	Aa1	Kansas City Power & Light Company	A3
Calpine Corporation	Caa1	Kentucky Power Company	Baa2
CenterPoint Energy Houston Electric, LLC	Baa3	Kentucky Fower Company	A2
CenterPoint Energy, Inc.	Ba2	Kentucky Utilities Co. Korea Electric Power Corporation	Ã2
Central Hudson Gas & Electric Corporation	A2	Korea Hydro and Nuclear Power Company Limited	A2
Central Illinois Light Company	A3	LG&E ENERGY LLC	A3
Central Maine Power Company	A3		Ã3
m - y - Angle grand - Albanda - Bar Togging	Baa3	London Energy plc	



### Global Power Issuer Ratings September 17, 2004

F

Company Name	Rating	Company Name	Rating
Pennsylvania Electric Company	Baa2	Sierra Pacific Resources	<b>B</b> 2
Pennsylvania Power Co.	Baa2	South Carolina Electric & Gas Company	A2
Pepco Holdings, Inc.	Baa2	Southern California Edison Company	8aa1
Pinnacle West Capital Corporation	Baa2	Southern Elect Generating Co	A2
Portland General Electric Company	Baa3	Southern Electric Power Distribution plc	Aa3
Potomac Edison Company (The)	Ba2	Southern Power Company	Baa1
Potomac Electric Power Company	Baa1	Southwestern Electric Power Company	Baa1
Progress Energy Carolinas, Inc.	Baa1	Southwestern Public Service Company	Baa1
Progress Energy Florida, Inc.	A2	Staticraft SF	Baa2
Public Service Company of Colorado	Baa1	Statnett SF	Aa3
Public Service Company of New Hampshire	Baa1	System Energy Resources, Inc.	Ba1
Public Service Company of New Mexico	Baa2	TXU Energy Company LLC	Baa2
Public Service Company of Oklahoma	Baa1	TXU Europe Group pic	Caa2
Public Service Electric and Gas Company	Baa1	TXU Europe Ltd.	Ca
Puget Energy, Inc.	Ba1	TXU US Holdings Company	Baa3
Puget Estology, Inc.	Baa3	Tampa Electric Company	Baa2
Red Electrica de Espana	A2	Texas-New Mexico Power Company	Ba2
Rochester Gas & Electric Corporation	Baa2	Tokyo Electric Power Company, Inc.	Aa3
SCANA Corporation	A3	Toledo Edison Company	Baa3
SEEBOARD Energy Ltd	A3	Tri-State G&T Association Inc.	Baa2
SP Distribution Ltd	A2	Tucson Electric Power Company	Ba3
SP Manweb plc	A2	UIL Holdings Corporation	Baa3
SP Transmission Ltd	<b>A</b> 2	Union Fenosa S.A.	Baa2
SSE Energy Supply Ltd	<b>A</b> 3	United Illuminating Company	Baa2
SSE Generation Ltd	<b>A2</b>	Vattenfall AB	<b>A3</b>
San Diego Gas & Electric Company	<b>A</b> 2	Virginia Electric and Power Company	<b>A</b> 3
Savannah Electric and Power Company	A2	West Penn Power Company	Ba1
Scottish Hydro-Electric Power Distribution	Aa3	Westar Energy, Inc.	Ba2
Scottish Hydro-Electric Transmission Ltd	Aa3	Western Massachusetts Electric Company	A3
Contline Down Congrating   trl	Baa1	Western Power Distribution (South West) plc	Baa1

CA-IR-122

#### Ref: T-4, Page 3, Lines 3 - 8.

Please provide complete copies of all studies, reports, analyses, workpapers, projections and other documents associated with HECO's evaluation of optimal production operations staffing and explain each alternative that was considered, as well the specific information relied upon to formulate new "around-the-clock" staffing plans.

#### **HECO** Response:

Please refer to HECO's responses to part d. of CA-IR-1, HECO T-6, on pages 2 and 3 filed with the Consumer Advocate on January 11, 2005 and CA-IR-48.

CA	-IR-	1	2	3

#### Ref: T-4, Page 7, Lines 11 – 13.

Please provide actual fuel prices for low sulfur fuel oil and diesel oil by month since Innuary 1

### **HECO Response:**

The following are the low sulfur fuel oil and diesel oil monthly prices (\$/BBL).

### FUEL PRICES ECONOMIC DISPATCH

	L.S.F.O. <u>HONOLULU</u>	L.S.F.O. WAIAU	L.S.F.O. <u>KAHE</u>	DIESEL WAIAU
MBTU Per Barrel	<u>6.2713</u>	6.2713	<u>6.2713</u>	<u>5.8160</u>
Ave. Price (\$/BBL)	35.2713	35.2713	35.2713	38.5103
Thruput (\$/BBL)	0.5792	0.1758	0.0784	, <del>4-</del>
01/01/2004 Price	<u>35.8505</u>	<u>35.4471</u>	<u>35.3497</u>	<u>38.5103</u>
MBTU Per Barrel	<u>6.2744</u>	<u>6.2744</u>	<u>6.2744</u>	<u>5.8204</u>

Thruput (\$/BBL)	0.4943	0.1688	0.0804	-
03/01/2004 Price	<u>35,2183</u>	<u>34.8928</u>	<u>34.8044</u>	<u>40.3478</u>
MBTU Per Barrel	<u>6.2953</u>	<u>6.2953</u>	<u>6.2953</u>	<u>5.7932</u>
Ave. Price (\$/BBL)	35.5481	35.5481	35.5481	40.4139
Thruput (\$/BBL)	0.7214	<u>0.1651</u>	0.0798	-
04/01/2004 Price	<u>36.2695</u>	<u>35.7132</u>	<u>35.6279</u>	<u>40.4139</u>
MBTU Per Barrel	<u>6.3370</u>	<u>6.3370</u>	<u>6.3370</u>	<u>5.7927</u>
Ave. Price (\$/BBL)	37.4949	37.4949	37.4949	44.0599
Thruput (\$/BBL)	<u>0.7025</u>	<u>0.1591</u>	0.0766	-
05/01/2004 Price	<u>38.1974</u>	<u>37.6540</u>	<u>37.5715</u>	44.0599
MBTU Per Barrel	<u>6.2885</u>	<u>6.2885</u>	<u>6.2885</u>	5.7840
Ave. Price (\$/BBL)	36.2014	36.2014	36.2014	52.3466
Thruput (\$/BBL)	0.3670	<u>0.1551</u>	0.0766	•
06/01/2004 Price	<u>36,5684</u>	<u>36.3565</u>	<u>36,2780</u>	<u>52.3466</u>
MBTU Per Barrel	<u>6.2817</u>	<u>6.2817</u>	6.2817	<u>5.8038</u>
Ave. Price (\$/BBL)	37.2892	37.2892	37.2892	58.6161

Thruput (\$/BBL)	<u>0.4743</u>	0.1612	<u>0.0781</u>	•
07/01/2004 Price	<u>37.7635</u>	<u>37.4504</u>	<u>37.3673</u>	<u>58.6161</u>
MBTU Per Barrel	<u>6.2763</u>	<u>6.2763</u>	<u>6.2763</u>	<u>5.7889</u>
Ave. Price (\$/BBL)	37.6173	37.6173	37.6173	53.3786
Thruput (\$/BBL)	0.6305	<u>0.1746</u>	0.0818	•
08/01/2004 Price	<u>38.2478</u>	<u>37.7919</u>	<u>37.6991</u>	<u>53.3786</u>
MBTU Per Barrel	<u>6.3351</u>	<u>6.3351</u>	<u>6.3351</u>	<u>5.8179</u>
Ave. Price (\$/BBL)	39.2290	39.2290	39.2290	57.6648
Thruput (\$/BBL)	<u>0.0578</u>	0.1807	0.0817	***
09/01/2004 Price	<u>39.2868</u>	<u>39.4097</u>	<u>39.3107</u>	<u>57.6648</u>
MBTU Per Barrel	<u>6.3180</u>	<u>6.3180</u>	<u>6.3180</u>	<u>5.7602</u>
Ave. Price (\$/BBL)	43.6334	43.6334	43.6334	58.9430
Thruput (\$/BBL)	0.5739	<u>0.1713</u>	0.0837	
10/01/04 Price	<u>44.2073</u>	<u>43.8047</u>	<u>43.7171</u>	<u>58.9430</u>
MBTU Per Barrel	6.3039	6.3039	6.3039	<u>5.7759</u>
Ave. Price (\$/BBL)	45.4696	45.4696	45.4696	60.7190

CA-IR-123 DOCKET NO. 04-0113 PAGE 4 OF 4

Thruput (\$/BBL)	0.5582	<u>0.1671</u>	0.0875	-
11/01/04 Price	<u>46.0278</u>	<u>45.6367</u>	<u>45.5571</u>	<u>60.7190</u>
MBTU Per Barrel	<u>6.2821</u>	<u>6.2821</u>	<u>6.2821</u>	<u>5.7720</u>
Ave. Price (\$/BBL)	48.9593	48.9593	48.9593	63.2086
Thruput (\$/BBL)	0.6423	0.1779	0.0866	•
12/01/04 Price	<u>49.6016</u>	<u>49.1372</u>	<u>49.0459</u>	63.2086

#### CA-IR-124

Ref:	T-4, Pages 11 – 12.
For the	he P-MONTH Production Simulation Model, please provide for the test year period in
-	
electi	ronic spreadsheet format and hard copy format the following:
2	the energy and havely land to be somewhile it. IIECO
	<b>-</b>
	-
b.	the energy and hourly load to be served by firm and non-firm purchased power producers;
c.	the load carrying capability for each HECO and firm power producer-generating unit, with an indication as to which units are on AGC;
d.	the minimum run time for each individual generating units used by HECO, including the Kalaeloa and AES units; and
e.	HECO's unit commitment as used in production simulation.

### **HECO Response:**

a. The following is a print out of the hourly load profile used in the production simulation run using standard EEI format. An electronic version will be provided under a separate transmittal

### CA-IR-124 DOCKET NO. 04-0113 PAGE 2 OF 14

### CA-IR-124 DOCKET NO. 04-0113 PAGE 3 OF 14

								PA	GE 3	UF I	7	
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327 5	923	920	917	934	962	1005	1046			857		681
327 5 328 5 328 5 329 5	643 1162	629 1153	620 1147	627 1135	670 1117	781 1125	906 1191	980 1182	1064	1122 934	1142 803	1157 709
329 5 329 5 330 5	663 1170 655	1167	633 1170	1161	673 1139	1130	1191	1157	1064	920	790	1156 699
330 5 331 5 331 5	1144 647	635 1147 629	625 1139 619	1126	669 1107 660		1167		1039	907	781	1136 691 1123
4 1 5	1130 662	1130 644	1119 636		1095 655	1103 745	1187	1156	1060	926	795	704 1110
4 1 5 4 2 5 4 2 5	1126 666	1138 645	635	632	1078 644	1069 674	1115 733	1080 849	988 917	898 984	794 1023	709 1026
4 2 5 4 3 5 4 3 5 4 4 5	1017 671 980	994 649 978	990 638 978	995 635 990	1008 642 1007	664	695	780	871	934	790 964	715 978
4 4 5 4 4 5	661 1161	645 1158	640 1163	645 1172	682 1153	1035 789 1155	928	1001	1107	1161		696 1158 698
4 5 5 4 5 5	658 1182	640 1175	633 1191	637 1173	670 1158	779 1143	908 1182	990 1172	1080 1078	1138 931	1161 791	1175 705
4 1 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	664 1145 660	647 1141 643	639 1143 636	643 1118 640	677 1097 674	785 1094 786		975 1135 990	1049	912	1133 778	1141 697
4 7 5 4 8 5 4 8 5	1182 649	1182 635	1180 629	1167 632	1146 664	919 771		1120 987	1007	876	1163 761 1153	1172 682 1165
4 8 5 4 9 5	1172 682	1170 658	1158 646	1143 645	1113 657	1094 695	1131 752	1097 864	1011 949	919 998	809 1021	727 1017
4 9 5 4 9 5 410 5 410 5	997 665 912	980 643 906	970 632 903	978 629 912	978 637 938	988 658 961	1032 688 1038	1020 765 1059	945 843 977	870 887 870	784 911	706 915
411 5 411 5	649 1141	635 1130	629 1120	634	663 1081	771 1075	897 1153	974 1145	1055 1026	1107 903	758 1120 772	683 1135 692
412 5 412 5 413 5	653 1099	637 1094	631 1081	635 1065	667 1049	770 1052	892 1116	960 1102	1032 1014	1070 875	1080 755	1094 678
411 5 412 5 412 5 413 5 414 5 415 5 416 5 416 5 416 417 7 418 419 419 5 419 420 5	646 1062 645	633 1065 630	625 1070 623	630 1055 627	658 1042 658	760 1041 761	872 1092 879	928 1078 942	995 1001 1023	1039 869 1062	1050 758 1084	1064 679 1095
414 5 415 5	1091 651	1086 636	1078 628	1064 629	1039 652	1036 715	1075 791	1070 896	974 987	864 1047	764 1062	686 1069
415 5 416 5 416 5	1053 655 945	1033 636 936	1011 626 925	992 624 931	994 634 942	997 665 951	1010 718 987	1008 816	942 892	856 945	766 960	693 960
417 5 417 5	653 854	635 845	624 844	621 852	631 864	653 869	676 934	991 741 964	929 802 916	854 849 834	767 862 736	697 861 664
418 5 418 5	637 1094		621 1089	625 1065	657 1053	755 1046	863 1120	952 1103	1030 997	1072 865	1092 749	1092 673
419 5 419 5 420 5	643 1076 640	628 1069 626	623 1065 621	627 1056 625	657 1039 653	758 1033 752	870 1092 872	936 1092	1001 1000 1023	1055 868 1064	1069 746 1083	1084 669 1081
420 5	1089 646				1059 661	1046 763	1089 879	1091	1004	877	756 1094	676 1105
421 5 422 5 422 5	657	638	630	1100	663	766	1120 887	978	1053	901 1103	776 1125	694 1133
423 5 423 5	1140 661 974	1133 641 963	1125 630 959	1116 627 964	1080 638 970	1049 668 971	1055 726 997	1058 830 1017	984 924 948	887 973 863	783 991 774	706 987 701
424 5 424 5	661 933	639 931	630 933	626 944	632 974	649 988	679 1032	758 1065	843 980	906 872	929 761	933 682
425 5 425 5 426 5	647 1182 652	632 1184 636				754 1128	877 1168	973 1173	1064	1128 911	1151 779	1172 692
426 5 427 5			628 1160 625	632 1146 628	660 1126 657	760 1105 751	880 1131 871	970 1135 957	1053 1042 1038	1103 900 1087	1140 767 1118	1155 684 1128
427 5 428 5	1141 662	1156 643	1155 636	1148 638	1140 668	1121 769	1155 897	1158 974	1070 1049	924 1121	790 1163	701 1167
428 5 429 5 429 5	663	1170 644 1167	636	639	670	771		1016	1073	934 1126	802 1158	709 1168
430 5 430 5	667	646 1000	635	635	646	675	1081 742 1058	1086 855 1065	990 953 990	902 1004 898	794 1019 803	710 1023 722
5 1 5 5 1 5	681 961	650 952	633 946	627 955	639 973	668 986	716 1012	806 1054	889 991	938 905	962 799	963 707
5 2 5	661	636	625	633	680	797	924	1002	1063	1103	1113	1112

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714455555555555555555555555555555555555	731 70 1205 120 731 70 1205 120 731 70 1196 119 741 707 1072 106 743 70 1036 103 731 69 1183 118 726 69 1183 120 787 75 1043 739 1055 106 756 720 1248 124 747 71 1230 122 732 702 1194 1183 726 69 1183 1184 726 69 1183 128 727 695 1184 128 727 695 1288 128 727 695 1288 128 727 695 1288 128 727 695 1281 1214 734 704 1211 1214 734 704 1058 726 1237 1244 735 720 1266 1274 750 728 12737 1244 735 709 1232 1232 737 1244 735 709 1232 1232 737 1244 738 1041 737 713 1247 714 1256 729 1277 715 1082 1071 737 716 1082 1071 737 713 1247 725 1256 727 1257 731	1 683 688 189 1197 1688 1687 1688 1688 1688 1688 1689 1688 1688 1689 1688 1688	4 1161 1142 8 734 826 1158 1123 1066 1055 1066 1055 1066 1055 1066 1055 1052 1053 1052 1053 1158 1123 1158 1123 1158 1123 1158 1158 1158 1158 1161 1837 1731 189 1856 1731 189 1856 1731 189 1856 1731 1836 1748 1856 1748 1856 1748 1856 1753 1856 1754 1856 1755 1856 1757 1857 1857 1757 1857 175	935 103 1128 111 1128 111 1128 111 1084 113 1084 113 1068 111 1068 111 1068 111 1069 110 1119 110 119 110	25 1102 115 26 1103 100 27 1103 100 28 1109 116 29 1103 109 20 1103 109 20 1059 198 21 1090 199 22 1094 114 23 1109 199 22 1094 114 23 1103 107 24 1018 107 25 1135 1135 105 26 1135 1135 105 27 1135 1091 115 28 1109 1109 29 1109 1109 20 1135 1091 1092 21 1109 1109 22 1109 1109 23 1109 1009 24 1018 1009 25 1135 1091 1093 26 1109 1094 1095 27 1135 1094 1095 28 1094 1094 1095 28 1094 1095 29 1134 1096 20 1037 1038 20 1037 1038 21 1108 1096 22 1110 1096 23 1109 1097 24 1015 1098 25 1112 1013 26 1129 1079 27 1013 1096 28 1097 1098 29 1134 1098 20 1037 1098 20 1037 1098 21 1134 1098 22 1134 1098 23 1129 1098 24 1099 25 1134 1099 26 1135 1091 1098 27 1015 1096 28 1097 1098 29 1134 1098 29 1135 1098 20 1134 1098 20 1134 1098 21 1134 1098 22 1134 1098 23 1129 1098 24 1098 25 1134 1098 26 1135 1091 27 1013 1096 28 1097 29 1134 1098 29 1135 1098 20 1134 1098 21 1134 1098 21 1134 1098 22 1134 1098 23 1134 1098 24 1098 25 1134 1098 26 1135 1098 27 1013 1098 28 1097 29 1135 1098 20 1037 20 1037 20 1037 20 1038 21 1134 1098 21 1135 1098 22 1139 1098 23 1139 1098 24 1098 25 1139 1098 26 1139 1098 27 1098 28 1098 29 1139 20 1098 20 1098 21 1098 22 1139 23 1139 24 1098 25 1098 26 1098 27 1098 28 1098 29 1098 20 1098 20 1098 20 1098 20 1098 21 1098 22 11098 23 1098 24 1098 25 1098 26 1098 27 1098 28 1098 29 1098 20 1098 20 1098 20 1098 20 1098 20 1098 20 1098 20 1098 21 1098 22 1198 23 1198 24 1098 25 1098 26 1098 27 1098 28 1098 29 1098 20	1189 17 7 1899 17 7 1899 17 7 1899 17 7 1899 17 7 1899 17 7 1899 17 7 1899 17 7 1899 17 7 1899 17 7 1899 17 7 1899 17 7 1899 17 7 1899 17 1899	999804898888901656051401977887858051849602908689728192909509148493948

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818 5	1233	1235		1208		1158		1208			892	799
819 5	748	721	708	711	750	863	981		1149	1190	1215	1226
819 5	1228	1232	1233	1229	1197	1153	1149	1153	1080	1003	905	815
820 5	758	726	709	703		753	812	918	995	1047	1071	1082
820 5	1071	1047	1033	1044	1039	1036	1044	1068	1014	943	862	786
821 5	735	704	688	686	695	722	754	827	918	979	1007	1010
821 5	1008	1009	1003	1015	1028	1040	1082	1119	1050	958	849	765
822 5	720	698	687	693	739	857	965	1045	1120	1178	1204	1218
822 5	1225	1230	1232	1223	1198	1175	1188	1216	1125	1009	874	783
823 5	731	707	693	697	757	872	980	1054	1147	1196	1222	1237
823 5	1247	1249	1253	1246	1188	1158	1185	1207	1117	1002	868	777
824 5	731	704	692	698	742	858	968	1035	1111	1155	1178	1189
824 5	1196	1198	1203	1193	1171	1139	1162	1183	1096	986	858	769
825 5	720	698	683	689	734	846	960	1038		1165	1190	1201
825 5	1208	1192	1179	1163	1133	1110	1132	1150	1063	962	844	758
826 5	709	685	672	676	718	820	929	1014	1096	1159	1174	1177
826 5	1189	1183	1185	1185	1147			1134		981	. 882	799_
											- H. K	-2.4

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12 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	694 1061 715 932 684	674 1075 677 929 653 1094 6592 677 929 630 1034 1110 663 10477 929 653	1644 11212 1652188 1652188 1630487 1630486 1630486 1630486 163043 16304 163043 16304 163043 16304 163043 163043 163043 163043 163043 163043 163043 163043 163043 163043 163043 163043 163043 163043 163043 163043 163043 163043 16	65046518888204005611658613688825443165861368888254431658613688896389633858963889638896389638064005661668613696438616546340643476643306416546434064643406464340646434064643406464340646434064643406464340646434064643406464340646434064646464	70894 10997 16948 16975	814 1205 8109 12024	963 1250 1297 12945 1297 12945 1297 12945 12915	987 1184 1197 1197 1197 1197 1197 1197 1197 119	105578998775771004391001100517809983110041100110011001100110011001100110011	9437 1964784 1964784 1996912515577 1996912515577 199691318 1996913 1	815148 81987 118198 118198 118198 118198 118198 118198 118198 118198 118198 118198 118198 118198 11819	724 725 721 721 721 721 721 721 721 721 721 721
1230 5 1230 5 1231 5 1231 5		1094 657 992	1085 640 977		1079 652	1128 683	1193 735 1118	1107 801	1026 907 986	939 987 915	833 1010 819	742 1014 726

b. The hourly loads of the firm and non-firm purchased power producers are included in the hourly output report that is provided as an electronic file (Excel spreadsheet named CA-IR-124b.xls) that will be submitted under separate transmittal. Within the file, the purchased power producers have the following unit designations:

- Kalaeloa is modeled as three units: #17 with 90 MW, #18 with 90 MW, and #21 with 29 MW for a total of 209 MW.
- AES-Hawaii is modeled as #19 with 180 MW.
- HPOWER is modeled as #20 with 46 MW.
- The Non-Firm purchased power producers are modeled as #2 with 0.79 MW.

  The output of the Excel spreadsheet is voluminous (approximately 325 pages).
- c. The load carrying capability for each HECO and firm power producer-generating unit is shown in HECO-WP-406, page 1, with the follow capabilities:

Unit	Capability (MW)
Hon 8	52.9
Hon 9	54.4
Waiau 3	46.2
Waiau 4	46.4
Waiau 5	54.6
Waiau 6	55.6
Waiau 7	88.1
Waiau 8	88.1
Waiau 9	51.9
Waiau 10	49.9
Kahe 1	88.2
Kahe 2	86.3
Kahe 3	88.2
Kahe 4	89.2
Kahe 5	134.7
Kahe 6	133.9
Kalaeloa	209.0
AES-Hawaii	180.0
HPOWER	46.0

#### HECO CHP was modeled as follows:

Dates	Capability (MW)		
01/01 - 04/30	0.098		
05/01 - 07/31	0.436		
08/01 - 08/31	1.306		

09/01 - 09/30	1.788
10/01 - 10/31	2.270
11/01 – 11/30	3.620
12/01 – 12/31	4.584

The HECO CHP used in the model represented the installed distributed generation kW adjusted for the 4.70% T&D Loss Factor and the 72.1% Availability Factor. Note that HECO will be revising its estimates of HECO CHP for the test year. Such information will be provided by the end of April 2005.

d. The minimum run time for each HECO and firm power producer-generating unit were as follows:

Unit	Hours
Hon 8	3
Hon 9	3
Waiau 3	3
Waiau 4	3
Waiau 5	3
Waiau 6	3
Waiau 7	1
Waiau 8	1
Waiau 9	1
Waiau 10	1
Kahe 1	1
Kahe 2	1
Kahe 3	1
Kahe 4	1
Kahe 5	1
Kahe 6	1
Kalaeloa	1
AES-Hawaii	1
HPOWER	1

e. The commitment of the generating units used the following procedures. Generating units are designated by its operating type: Must Run, Intermediate (i.e., cycling), and Peaking.

The Must Run units were committed every hour whenever available. Intermediate units

were committed before Peaking units. A Penalty Factor was used to reflect the differences in transmission line losses. The minimum average costs was multiplied by the penalty factors to calculate the equivalent costs and the commitment priority was based on the equivalent costs.

The Must Run units were Kahe 1 through Kahe 6, Waiau 7 and 8, Kalaeloa, AES-Hawaii, and HPOWER. The Intermediate units were Waiau 3 through Waiau 6, Honolulu 8 and 9. The Peaking units were Waiau 9 and 10.

The Penalty Factors were as follows:

Unit	Factor
Hon 8	0.997
Hon 9	0.997
Waiau 3	1.006
Waiau 4	1.006
Waiau 5	1.012
Waiau 6	1.012
Waiau 7	1.012
Waiau 8	1.012
Waiau 9	1.012
Waiau 10	1.012
Kahe 1	1.026
Kahe 2	1.026
Kahe 3	1.026
Kahe 4	1.026
Kahe 5	1.026
Kahe 6	1.026
Kalaeloa	1.029
AES-Hawaii	1.029
HPOWER	1.000

The costs were determined by using the ABC coefficients shown in HECO-WP-406, page 2, and the fuel prices shown in HECO-402.

#### Ref: T-4, Page 12, Line 5.

Please provide a detailed statement and diagram describing the test year overhaul maintenance schedule for generating units (including Kalaeloa, AES-Hawaii and H-Power) used in production simulation in the test year. Include the duration, purpose and scope of each planned outage by unit.

#### **HECO Response:**

Please see the response to CA-IR-43.a, where HECO has provided a copy of the 2005 O&M Planned Maintenance Schedule dated January 12, 2004, that was used in the production simulation for the direct testimony. As stated in the response to CA-IR-43.b, the schedule was revised as of 2/3/05, and is being further revised.

### Ref: T-4, Page 14, Line 13.

Please provide, by source, the annual non-firm power purchased for the year 2004, from each power producer.

### **HECO Response:**

The annual non-firm power purchased for 2004 is as follows:

Chevron 90,146 kWh Tesoro Hawaii 3,677,119 kWh Non-Firm Total 3,767,265 kWh

#### Ref: T-4, Page 14, Line 18.

- a. Please explain what is meant by "normal top load rating" and the manner that the NTL was determined for each of HECO's units.
- b. Please provide the generating unit nameplate capacity rating for each of the units listed in HECO-WP-406, page 1.

#### **HECO Response:**

- a. "Normal top load rating" for capacity planning purposes means the maximum continuous normal operating load that the generating unit will generate with the turbine valves wide open, all feedwater heaters in service, and the boiler drum at 105% of rated pressure.
- b. Generator nameplate ratings are given in MVA and Amps. HECO uses the following as its guideline for MW ratings:

Unit	MVA	Amps	%PF	MW calculated
Hon 8	62.5	3,137	80	50.0
Hon 9	64.0	3.215	85	54.4
Waiau 3	57.5	3,020	87	50.0
Waiau 4	57.5	3,020	87	50.0
Waiau 5	64.0	3,215	85	54.4
Waiau 6	64.0	3,215	85	54.4
Waiau 7	96.0	3,849	85	81.6
Waiau 8	96.0	3,849	85	81.6
Waiau 9	57.0	2,385	90	51.3
Waiau 10	57.0	2,385	90	51.3
Kahe 1	96.0	3,849	85	81.6

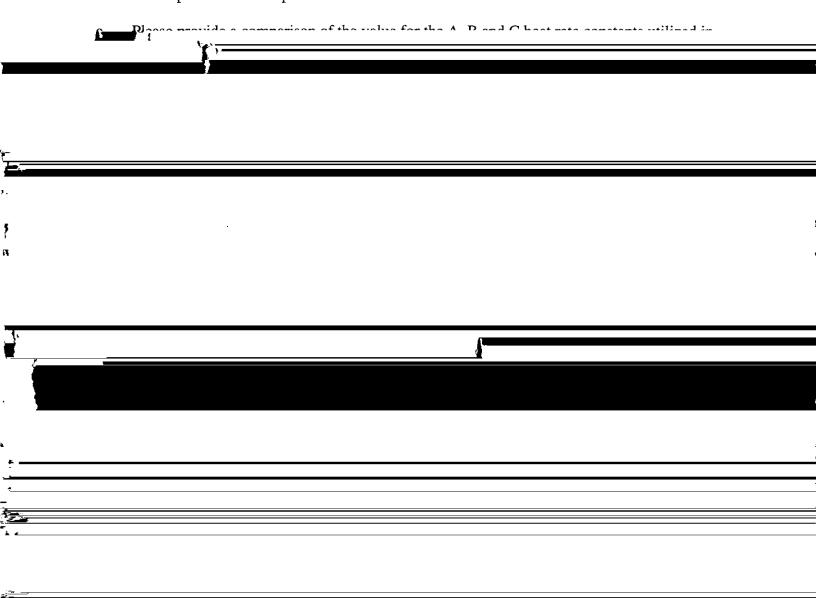
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Kahe 2	96.0	3,849	85	81.6
Kahe 3	101.0	4,050	85	85.85
Kahe 4	101.0	4,050	90	90.9
Kahe 5	158.8	5,730	85	134.98
Kahe 6	158.8	5,730	85	134.98

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### Ref: T-4, Page 15, Line 8.

- a. Please provide all workpapers, analyses and source documents for the test data and the manufacturers' unit data for calculating the A, B, and C "heat rate constants."
- b. Please provide the completion date of test data.



HECO's last rate case with those utilized for each unit by HECO in this rate case and an explanation of the differences.

#### **HECO Response:**

a. The data is voluminous. One copy each with be provided to the Consumer Advocate,

Department of Defense and the Commission under separate transmittal.

	2		
Kahe 4	75.55387	8.43939	0.00739
Kahe 5	89.34437	8.64339	0.00305
Kahe 6	117.08141	8.18332	0.00770

57.74815

HECO determined that there was a need to update the input/output (I/O) ABCs. First, the previous set of I/O ABCs as provided in the voluminous documents was based upon dated information and, in some cases, older testing techniques (e.g. Manual testing techniques were used for Hon. 8 and 9 and Waiau 3 and 4. Currently, HECO is using the Plant Information Monitoring System ("PI Monitor")). Secondly, using available information, HECO has only recently been able to identify deterioration trends and forecast their impacts into future years for its reheat units.

The above I/O ABCs were updated as of 12/31/04 to reflect their latest operating conditions going into 2005 (except for Waiau 4 due to inaccurate flow measurement). In comparing the I/O ABCs with past daily heat rates, HECO discovered an unmistakable trend in deterioration among its reheat units. This deterioration would occur after boiler outage work until a reheat unit's next outage in which there would be recovery of unit efficiency. In sum, the HECO reheat units would experience "sawtooth" deterioration between boiler outages. Therefore, using the latest test year overhaul schedule, HECO applied adjustment

Waiau 3	2/25/98
Waiau 4	2/19/98
Waiau 5	1/02/02
Waiau 6	10/29/01
Waiau 7	4/12/03
Waiau 8	9/16/02
Waiau 9	11/17/94
Waiau 10	5/2/95
Kahe 1	4/13/03
Kahe 2	9/17/02
Kahe 3	7/05/02
Kahe 4	4/26/03
Kahe 5	4/13/03
Kahe 6	9/26/01

c. The Input/Output ABC constants utilized in the 1995 Rate Case were derived on a gross basis. This means that auxiliary or electrical consumption used by plant equipment to generate electricity was not accounted for. The auxiliary consumption varies directly with the loading of the unit. The ABC constants utilized in these proceedings were derived on a net basis and account for auxiliary consumption at each load point. A direct comparison is not applicable because of this.

Due to the voluminous nature of the information, one copy (pages 4 to 221) will be provided to the Consumer Advocate, Department of Defense and the Public Utilities Commission under separate transmittal.

(SUPPLEMENTAL 5-2-05)

#### CA-IR-128

#### Ref: T-4, Page 15, Line 8.

- a. Please provide all workpapers, analyses and source documents for the test data and the manufacturers' unit data for calculating the A, B, and C "heat rate constants."
- b. Please provide the completion date of test data.
- c. Please provide a comparison of the value for the A, B and C heat rate constants utilized in HECO's last rate case with those utilized for each unit by HECO in this rate case and an explanation of the differences.

#### **HECO Response:**

a. The data is voluminous. The documents are available for inspection at HECO's Regulatory

Affairs Division. Please contact Irene Sekiya at 543-4778 to arrange for inspection.

Due to the change in test year overhaul schedule (dated 4/8/05), the Test Year 2005 A, B and C heat rate constants have been updated for the reheat units (Waiau 7/8 and Kahe 1 to 6). The updated net A, B and C heat rate constants for each HECO, steam, generating unit are provided below:

Unit	Α	В	С
Honolulu 8	36.41316	10.31147	0.00568
Honolulu 9	69.89196	8.94844	0.02204
Waiau 3	146.53942	4.81132	0.08544
Waiau 4	49.46043	9.31119	0.03203
Waiau 5	61.05946	8.81372	0.02981
Waiau 6	64.11038	8.74074	0.03199
Waiau 7	88.21069	7.94047	0.01961
Waiau 8	86.87118	8.09192	0.01315

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(SUPPLEMENTAL 5-2-05)

Kahe 1	73.49912	8.17333	0.01292
Kahe 2	46.00372	9.09521	0.00350
Kahe 3	57.48642	8.51694	0.00634
Kahe 4	75.55387	8.43939	0.00739
Kahe 5	89.34437	8.64339	0.00305
Kahe 6	117.0609	8.18188	0.00769

HECO determined that there was a need to update the input/output (I/O) ABCs coefficients. First, the previous set of I/O ABCs were based upon dated information and, in some cases, older testing techniques. Secondly, using available information, HECO has only recently been able to identify deterioration trends and forecast their impacts into future years for its reheat units.

The above I/O ABCs were updated as of 12/31/04 to reflect their latest operating conditions going into 2005 (except for Waiau 4 due to inaccurate flow measurement). In comparing the I/O ABCs with past daily heat rates, HECO discovered an unmistakable trend in deterioration among its reheat units. This deterioration would occur after boiler outage work until a reheat unit's next outage in which there would be recovery of unit efficiency. In sum, the HECO reheat units would experience "sawtooth" deterioration between boiler outages. Therefore, using the latest test year overhaul schedule, HECO applied adjustment factors to its reheat ABC coefficients. The impact of this adjustment factor was to both improve and deteriorate the unit efficiencies.

b. The date of the data used to generate the Input/Output ABC constants are shown below:

Honolulu 8 9/25/98

Honolulu 9 6/20/96

Waiau 3 2/25/98

(SUPPLEMENTAL 5-2-05)

Waiau 4	2/19/98
Waiau 5	1/02/02
Waiau 6	10/29/01
Waiau 7	4/12/03
Waiau 8	9/16/02
Waiau 9	11/17/94
Waiau 10	5/2/95
Kahe 1	4/13/03
Kahe 2	9/17/02
Kahe 3	7/05/02
Kahe 4	4/26/03
Kahe 5	4/13/03
Kahe 6	9/26/01

c. The Input/Output ABC constants utilized in the 1995 Rate Case were derived on a gross basis.
This means that auxiliary or electrical consumption used by plant equipment to generate electricity was not accounted for. The auxiliary consumption varies directly with the loading of the unit. The ABC constants utilized in these proceedings were derived on a net basis and account for auxiliary consumption at each load point. A direct comparison is not applicable because of this.

#### Ref: T-4, Page 16, Line 11.

For each generating unit please provide the actual maintenance overhaul days for 2001, 2002, 2003, and 2004 and a description of the maintenance overhaul work done during each of those outages.

#### **HECO Response:**

Please see the attached maintenance summaries for the number of days of the maintenance overhaul days and a description of the maintenance overhaul work done during each of those outages. Please also refer to IR-41 and IR-42 for actual outages for 2003 and 2004.

# HAWAIIAN ELECTRIC COMPANY, INC. POWER SUPPLY OPERATION & MAINTENANCE

2001 OVERHAUL SUMMARY

Unit	Start	Finish (Bkr	Wks/Days	<u>Description</u>
	(Bkr open)	close)	0.7	
W6	12/29/00	2/28/01	8.5	Scheduled unit overhaul.
P0000243				Air preheater-intermediate baskets replacement, basket
				trolley installation.
				Auxiliary Transformer-NDT, fire sprinkler installation
				(capital).
				Boiler-Inspection by state inspector, BRULs/HiEL, boiler
			1	casing/refractory repairs, expansion joint repairs,
		1		videoprobe primary superheater, superheater and air
				preheater, secondary superheater casting supports
				replacement, realigned primary superheater tube elements,
				boiler sidewall (Ewa/Waikiki) dutchman installation.
				Boiler chemical cleaning-CuSol process.
				Boiler safety valves-serviced RV-49, RV-50, RV-51, RV-
				52.
ļ		-		Boiler stack-liner repairs.
				Chiller-W61 cleaned tubes w/scrapers.
				Condenser-cleaned tubes w/brushes.
				Eddy current testing-air ejector tubes, FWH 61 tubes,
		and the same of th	İ	FWH 62 tubes, FWH 65 tubes.
				ERV-53-Installed new electromatic ball valve on
		1		secondary superheater outlet.
		ļ		Forced Draft Fan-inlet guide vane ball pins replacement,
				NDT fan blades.
				Generator-generator overhaul, DC hi-pot test (stator),
				partial stator re-wedge, generator bore inspection, NDT
		Ì		generator retaining rings, permanent flux probe installed,
				re-babbit #5, #6 bearings, calibrated voltage regulator, H2
		-		purity analyzer (capital).
				Main Transformer-replaced secondary bushings, painted
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	The state of the s			for corrosion control, NDT, fire sprinkler installation (capital).  Main stop valve-weld repaired valve seat.  Section 8 relief valves-Replaced relief valves for var feedwater heat exchangers, secondary fuel oil heaters reboiler.  Turbine-HP and LP turbine overhaul, HP bore inspect LP bore inspection, throttle valves (2) service, balance

Unit	Start (Bkr open)	Finish (Bkr close)	Wks/Days	<u>Description</u>
				HP/LP stub shaft, lube oil tank and bower repairs/painting. Boiler Feed Pump 61-volute replaced.  480V Breaker Electronic Trip Retrofit (capital)-SFOP 61 & 62, ACWP #2, 480V main, 480V MCC, CDP 61 & 62, FD LS fan, turbine auxiliary oil pump 61.
W4 P0000244	05/14/01	05/25/01	1.4	Scheduled Unit Overhaul.  Auxiliary Transformer-Fire sprinkler installation (capital)  Boiler-Inspection by state inspector, ww tube sample for deposit analysis, GB9 sootblowers replaced (bottom level-2 <sup>nd</sup> from Ewa, top level-4 <sup>th</sup> from Ewa), opacity monitor replacement (capital), 7 <sup>th</sup> floor boiler casing encapsulated.  Boiler Safety Valves-Boiler steam drum safety valve, RV-50, RV-51, mods (capital) from 4 valves to 2 (RV-48, RV-49 are now blanked).  Induced Draft Fan-Motor cleaned and serviced.  Main Transformer-Fire sprinkler installation (capital).  Monitoring Instrumentation-lube oil sample taps for various motors.  Section VIII Relief Valves-Replaced RV-45, RV-29, RV-87.
K2 P0000247	07/16/01	09/08/01	7.5	Scheduled unit overhaul.  Air Preheater-replaced cold end baskets.  Auxiliary Equipment- boiler feed pump recirculation control valves replacement (capital), K21/22 condensate pump suction expansion joints replaced, K22 condensate pump packing replaced w/mechanical seal, K21/22 pump suction cans inspected and weld repaired.  Auxiliary Transformer-NDT, replacement of 2.4kV cables from auxiliary transformer to unit switchgear room, fire sprinkler installation (capital).  Boiler-Inspection by state inspector, reheat/superheat attemperation control valves/block valves replacement (capital), burner throat refractory re-contoured and replaced with new refractory, BRULS/HiEL.  Boiler Safety Valves-Retrofitted RV-49, RV-50, RC-52, RV-55, RV-56, RV-57.  Boiler Stack-re-lined interior, painted exterior.  Forced Draft Fan-inlet guide vane ball pins replacement, recirculation duct removed, vanes and arms replaced with

Unit	Start (Bkr open)	Finish (Bkr close)	Wks/Days	<u>Description</u>
				long vanes.
				Circulating Water System-K11/K12 chillers
				cleaned/repaired/epoxy coated the covers, K21/K22 tunnels
				cleaned, central well valve repairs
				DCS (Digital Controls System)-UPS
				maintenance/servicing.
				Eddy Current Testing-FWH 22 tubes, FWH 23 tubes,
				FWH 24 tubes, FWH 25 tubes, condenser 100%, air
		-		ejector, K12 chiller.
				Generator- NDE generator retaining rings, generator
				overhaul, voltage regulator calibration, partial stator re-
				wedge (3 rows) @ collector end and turbine end, stator and
				rotor field NDT, grounding brush replaced, H2 seals
		<u> </u>		replaced.
				IRIS (internal rotary inspection system) testing-H2
				coolers.
				Main Transformer-NDT, fire sprinkler installation
				(capital), sudden pressure relay replaced.
				Monitoring Instrumentation- Installed isokinetic nozzles
7				in feedwater and main steam piping, installed lube oil
1				sampling fittings/valves for various motor bearings, data
				acquisition (capital), K21/22 BFP bearing temperature
				monitors (capital).
				Section VIII Relief Valves-Replaced RV-40, RV-44, RV-
				45, Rv-21.
				Turbine-lube oil replaced, lube oil tank interior re-painted
				for corrosion control, turbine vacuum breaker valve
				replaced, repairs to governor/throttle/reheat stop/intercept
				valves.
				480V Breaker Electronic Trip Retrofit (capital)-480
				motor control center, main breaker, service water pump #2,
				secondary fuel oil pump 21/22, auxiliary cooling water
				pump 21, service air compressor 21, sand pump circuit #2,
				480 spare.

Unit	Start (Bkr open)	Finish (Bkr close)	Wks/Days	<u>Description</u>
W4 P0000244	9/17/01	10/17/01	4.2	Air Preheater-Tubes leak checked/plugged. Auxiliary Transformer-NDT, transformer covers (3) replaced. Boiler-Boiler chemical cleaning (CuSol & Vertan), Front waterwall tubes replacement, burner swirlers (6) replaced, refractory repairs, boiler casing insulation repairs, superheat attemperator nozzle replacement (capital). Boiler Stack-Exterior painted, interior lining replacement and breeching structural repairs (capital). Feedwater System-Economizer check valve pressure seal gasket replaced. Generator-H2 purity meter installed (capital). Induced Draft Fan-Cleaned and balanced. Main Transformer-NDT. Section VIII Relief Valves-RV-41, RV-42 replaced. Turbine-Ewa throttle valve repairs
K3 *0000248	107/01	12/16/01	10.0	Scheduled Unit Overhaul.  Air preheater-cold end baskets replacement.  Auxiliary equipment- boiler stack (gunite) lining repairs, boiler feed pumps discharge nozzle NDE,  Auxiliary Transformer-NDT (insulation resistance test, turns ratio test, doble power factor insulation test),, fire sprinkler testing.  Boiler-Inspection by state inspector, BRULs/HiEL, boiler casing/refractory repairs, expansion joint repairs, secondary superheater dis-simmilar weld dutchmans, opacity monitor upgrade (capital), control room recorders replacement (capital), fuel oil return Coriolis meter installation (capital), air preheater basket layer modifications, superheat/reheat control valves upgrade (capital), gas out duct (interior) corrosion control-painting, gas recirculation duct refractory repairs, boiler chemical cleaning (CuSol).  Boiler Safety Valves-RV-49 retrofit, RV-50 retrofit, RV-52 retrofit, RV-53 service, RV-55 retrofit, RV-56 retrofit, RV-57 retrofit.  Chiller-K31 cleaned tubes w/scrapers, cover repairs/coating.  Condenser-cleaned tubes w/scrapers.  Eddy current testing-FWH 31, FWH 32, FWH 34, FWH 35, air ejector, chillers, condenser.

Forced Draft Fan-inlet guide van ball pins replacement, NDT fan blades.  Generator-metering current transformers (16) replaced, voltage regulator calibrated.  IRIS (internal rotary inspection system) testing-H2 coolers.	l .	Start (Bkr open)	Finish (Bkr close)	Wks/Days	<u>Description</u>	
IRIS (internal rotary inspection system) testing-H2 coolers.					Generator-metering current transformers (16) replaced,	
					IRIS (internal rotary inspection system) testing-H2 coolers.	
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### HAWAIIAN ELECTRIC COMPANY, INC. POWER SUPPLY OPERATION & MAINTENANCE 2002 OVERHAUL SUMMARY

Description
K1 scheduled unit overhaul (P0000251). Breaker open 1-5-02. Breaker closed 2-26-02. 7.3 wks.
Boiler – BRULs/HiEL, boiler tubes wash; boiler inspection; ww tube sample removed for deposit analysis; refractory/casing repairs; chemical cleaning (2-step CuSol/Versol firing process); section I safety valves internal retrofit/hydroset; refractory/casing repairs; IK soot blowers service; observation ports clean/service; atmospheric blow down tank service; O2 analyzer service.
<b>Boiler draft system</b> – APH baskets wash; various power operators service; FDF high speed motor stator/rotor recondition; FDF vanes clean/service, vane ball pins replace; manual dampers service; various expansion joint repairs; K1 boiler stack exterior paint; opacity monitor replace (capital); gas recirculation fan service; draft lines unplug.
Circulating water system – K11 condenser tubes (20%) eddy current NDT; K12 condenser tubes (20%) eddy current NDT; K11/K12 tunnel cleaning; K12 circulating water pump motor stator/rotor recondition; K11 circulating water pump motor stator/rotor recondition.
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#### **Description**

hoses replace; igniters service; various isolation valves replace; K12 secondary fuel oil pump motor stator/rotor recondition; K12 primary fuel oil pump motor stator/rotor recondition; K11 secondary fuel oil pump motor stator/rotor recondition; cold reheat to reboiler control valve VPC-2 internals replace.

Generator - Eddy current H2 coolers; NDT rotor retaining rings; generator H2 seals replace; 100% stator re-wedge; rotor NDT tests/inspection; rotor radial leads tested/repaired; voltage regulator/rheostat service; air filters on voltage regulator doors install; generator relay trip test; generator partial discharge monitor (capital).

Instrument air system – reducing valves replace; air filters replace.

Service air system - service air compressor motor stator/rotor recondition.

**Turbine** - throttle valves (2) NDT; serviced main/auxiliary governors; #1 bearing bracket assembly redesign; turbine lube oil replace; extraction to feed water heater bleeder trip valves service; lube oil tank/bowser tank service/interior re-coated.

Water system – K11 chiller tubes clean/repair covers and re-coat; K11 chiller tubes eddy current NDT; K11 auxiliary cooling water pump motor stator/rotor recondition; K11 service water pump breaker (480V) contacts replaced; K1 boiler wash pump breaker (480V) contacts replaced.

K4 scheduled unit overhaul (P0000520). Breaker open 3-2-02. Breaker close 3-30-02. 4.0 wks.

**Boiler** – BRULs/HiEL; boiler tubes wash; boiler inspection; refractory/casing repairs; observation ports

#### Description

Electrical system – service various line starters, switchgear, lighting panels, transformers; main and auxiliary transformers NDT/service; main/auxiliary transformers fire sprinkler test.

Feed water system – K41/K42 BFP lube oil reservoir clean/service; K42 seal cooler install; K44/K45 FWH tubes eddy current NDT; K41/K42 BFP recirculation piping re-route to condenser; BFP K41/K42 discharge piping nozzle welds NDT.

Fuel oil system – K41/K42 secondary fuel oil pump coupling replace; K43 primary fuel oil pump coupling cover replaced; K42 primary fuel oil pump bearing replace; burner hoses replace; igniters service; K42 primary fuel oil pump motor stator/rotor recondition.

**Generator** – oil seal (collector end) clearances reset; shaft grounding brush replace; generator relay trip test; voltage regulator/rheostat service; voltage regulator wiring repairs; #5 bearing drain holes unplugged.

Instrument air system – air filters replace.

**Turbine** – lube oil reservoir/bower tanks cleaned, filters replace; lube oil coolers clean/service; main stop valve servo valve replace; steam seal regulator service; #5 bearing drain holes unplug; two upper control valves bleed off line flex gaskets replace; #4 bearing vibration probe re-tightened.

Water system – K41 auxiliary cooling water pump motor bearings replace; K41 station service water pump motor bearings replace; K41 chiller tubes eddy current NDT/clean; K41 chiller end cover refurbish/re-coat; service water central well sand trap repairs/valve repairs; K1 auxiliary cooling water pump motor stator rewind/rotor recondition.

K6 scheduled unit overhaul (P0000250). Breaker open 5-4-02. Breaker closed 8-9-02. 14.0 wks.

**Boiler** – BRULs/HiEL; boiler tubes wash; O2 analyzer upgrade (capital); boiler inspection; ww tube sample removed for deposit analysis; section I safety valves service/hydroset; various isolation and drain valves replace; main steam stop valve MOV-1 repack; refractory/casing repairs; auxiliary steam control valve VPC-5A internals replace; 6<sup>th</sup> floor water cooled door replaced; cold reheat extraction drain trap control valve VFC-46 internals replace; observation ports clean/service; atmospheric blow down tank service; K61/62 air heater duct internal preservation.

Boiler draft system – APH baskets wash; air heater acoustic soot blower (capital); FDF vanes clean/service, vane ball pins replace; power operators service; K61/K62 cold end baskets replace; gas recirculation fan motor recondition rotor & stator; opacity monitor service; K61/K62 APH gas out duct corrosion control/coating repairs; air pre-heater drive service; draft lines unplug; manual dampers service; gas recirculation fan service.

Circulating water system - K61/62 circulating water tunnels clean; circulating water pit concrete

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PAGE 10 OF 28
Description
spalling repairs; circulating water temperature monitor install (capital); central well sluice gates repair; K61/K62 CWP pump head corrosion control/paint; condenser tubes eddy current NDT; K61 CWP recondition motor stator & rotor; K61 condenser tubes (20%) eddy current NDT; K62 condenser tubes (20%) eddy current NDT.
Condensate system – various isolation and drain valves replace: K61/K62/K63 FWH tubes eddy current
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Water system – distilled water tank level instrumentation replace (capital); K61 chiller service/clean, tubes eddy current NDT; K61 (or K52) auxiliary cooling water pump motor recondition rotor & stator; various section VIII relief valves replace.

W5 Scheduled unit overhaul (P0000252). Breaker open 9-14-02. Breaker closed 3-24-03. 27.2 wks. Overhaul extended into 2003 due to extensive turbine repairs.

**Boiler** – BRULs/HiEL; boiler inspection; boiler tubes wash; chemical cleaning completed using non-firing method (2-step CuSol process); ERV install (capital); main steam stop valve MOV-1 actuator replace (capital); Ewa/Waikiki sidewall tubes at the rear end of the SW headers replace; rear wall furnace tubes (various) replace; economizer tube bends replace; casing refractory/insulation repairs; IK soot blower steam pressure control valve VPC-18 replace (capital); various isolation and drain valve repairs; section I boiler safety valves service/hydroset; service O2 analyzer; observation ports clean/service; atmospheric blow down tank service; main steam stop valve MOV-1 motor stator/rotor recondition; main steam stop valve MOV-1 disk replace.

Boiler draft system – APH baskets wash; interior coating replaced w/vinyl ester; APH duct corrosion control/coating; opacity monitor upgrade (capital): NDT air pre-heater rotor; air pre-heater post diaphragm

#### **Description**

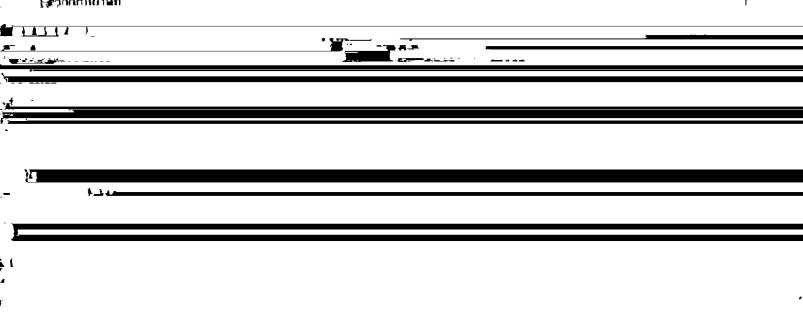
Feed water system – FWH 55 tubes eddy current NDT; replace FWH 54 (capital); BFP automated testing instrumentation (capital); install isokinetic nozzles for cycle chemistry instrumentation (capital); various FWH relief valves (section VIII) replace; various isolation and drain valve repairs; BFP 52 volute replaced; BFP motor rotor/stator recondition and replace leads; W51/W52 BFP discharge piping nozzle welds NDT; feed water regulating control valve VLC-23 internals replace; feed water bypass control valve VFc-10 internals replace; W51/W52 BFP recirculation control valves VFC-8, VFC-9 internals replace; attemperator block valve VTC-7 internals replace; attemperator spray control valve VTC-8 internals replace.

Fuel oil system – various fuel oil relief (section VIII) valves replace; igniter assemblies (6) replace (capital); W51/W52 secondary fuel oil pump breakers retrofitted w/vacuum breakers (capital); fuel oil supply control valve VFC-5 internals replace; fuel oil return control valve VFC-7 replace.

Generator - H2 Purity Meter (capital); 18 generator current transformers replaced (capital); stator core rewind and testing (includes new stator bars and coils w/type F insulation) (capital); generator protection relay (287 & 240) upgrade to microprocessor unit (capital); generator grounding brush install (capital); flux probe port install (capital); stator 100% re-wedge; H2 piping kerotest valves replace; stator RTD terminal block replace; NDT rotor retaining rings; generator rotor bore; rotor NDT tests/inspection; rotor radial leads test/repair; voltage regulator/rheostat service; hoses to H2 coolers (both coolers) replace; eddy current NDT H2 coolers; H2 Kerotest (< 1") valves replace; generator relay trip test.

Instrument air system – various relief valves (section VIII) replace; reducing valves replace; air filters replace.

Service air system – various relief valves (section VIII) replace; service air compressor motor stator/rotor



#### Description

warming (incomplete,-capital); boiler safety valve (section I) upgrade/hydroset (capital); boiler thermocouples replace w/upgraded recorder (capital); soot blower air compressor #2 480V switchgear contacts rebuild; SSH outlet header nozzle repairs; casing/refractory repairs; observation ports clean/service; boiler inspection; atmospheric blow down tank service; front WW Header handhole repairs.

Boiler draft system – APH baskets wash; H91/H92 cold end APH baskets replace; acid resistant gunite liner (stack interior) install (capital); stack exterior paint; opacity monitor service and replace CRU unit; FD fan clean/service and vanes ball pins replace; H91/H92 ID fan clean/service and vanes ball pins replace; power operators service; various isolation and drain valves replace or repair; air pre-heater drives service; major air out expansion joint repairs; manual dampers service

Circulating water system –hotwell conductivity probes/instrumentation replace (capital); H91 condenser tubes (20%) eddy current NDT; H92 condenser tubes (20%) eddy current NDT; H91/92 condenser outlet drop leg expansion joints replace.

Condensate system – various relief valves (section VIII) replace; FWH 91/92 tubes eddy current NDT; air ejector service; hog jet service; air ejector tubes eddy current NDT.

Control room equipment - various metering instrumentation calibrate; condenser vacuum gauge replace 'capital); condenser backpressure gauge install (capital).

Electrical system - main and auxiliary transformers NDT/service; service various line starters, switchgear, lighting panels, transformers; DB25 electronic trips upgrade for various 480V breakers (capital); install lube oil sample taps for various motors; main/auxiliary transformers fire sprinkler test.

Feed water system - BFP H92/H93 discharge piping nozzle welds NDT; various relief valves (section VIII) replace; FWH 94, 95 tube eddy current NDT; feed water regulating valve VLC-23 internals replace; feed water bypass valve VFC-14 internals replace; SH attemperator spray control valve VTC-8 internals replace; BFP recirculation control valves VFC-9, VFC-10 internals replace.

Fuel oil system-Coriolis meter install (capital): H91/H92 primary fuel oil pumps replace (capital): burner

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<b>Description</b>									
Instrument air system – va	rious section \	VIII relie	ef valv	es repl	ace; redu	cing valv	es rep	lace;	filters
replace.									

**Turbine** – Supervisory instrumentation install (bearing vibration, differential expansion, thrust, key phasor) (capital); HP Curtis R1/R2 rotating blades replace (capital), HP Curtis stationary blades replace (capital); HP stage 2 rotating blades (capital); HP stage 3 rotating blades (capital); HP C1-C4 stationary

·	age 3 rotating blades (capital	); HP C1-C4 stationary	
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#### HAWAIIAN ELECTRIC COMPANY, INC. POWER SUPPLY OPERATIONS & MAINTENANCE 2003 OVERHAUL SUMMARY

H9 Schedule Unit Overhaul (P0000138). Breaker open 11-30-02. Breaker closed 3-23-03. 16.1 wks. See 2002 Maintenance Outage Summary for details.

W5 Scheduled unit overhaul (P0000252). Breaker open 9-14-02. Breaker closed 3-24-03. 27.2 wks. Overhaul extended into 2003 due to extensive turbine repairs.

Boiler – BRULs/HiEL; boiler inspection; boiler tubes wash; chemical cleaning completed using non-firing method (2-step CuSol process); ERV install (capital); main steam stop valve MOV-1 actuator replace (capital); Ewa/Waikiki sidewall tubes at the rear end of the SW headers replace; rear wall furnace tubes (various) replace; economizer tube bends replace; casing refractory/insulation repairs; IK soot blower steam pressure control valve VPC-18 replace (capital); various isolation and drain valve repairs; section I

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clean/service; atmospheric blow down tank service; main steam stop valve MOV-1 disk replace.

Boiler draft system – APH baskets wash; APH duct interior coated w/vinyl ester for duct corrosion control/coating; opacity monitor upgrade (capital); NDT air pre-heater

Electrical system – service various line starters, switchgear, lighting panels, transformers; DB25 electronic trips upgrade for various 480V breakers (capital); FD fan low speed low vacuum breaker install (capital); main and auxiliary transformers NDT/service; replace rocks; main/auxiliary transformers fire sprinkler test, black plant for 2.3 kv and 480V systems.

Feed water system – FWH 55 tubes eddy current NDT; replace FWH 54 (capital); BFP automated testing instrumentation (capital); install isokinetic nozzles for cycle chemistry instrumentation (capital); various FWH relief valves (section VIII) replace; various isolation and drain valve repairs; BFP 52 volute replaced; BFP motor rotor/stator recondition and replace leads; W51/W52 BFP discharge piping nozzle welds NDT; feed water regulating control valve VLC-23 internals replace; feed water bypass control valve VFC-10 internals replace; W51/W52 BFP recirculation control valves VFC-8, VFC-9 internals replace; attemperator block valve VTC-7 replace internals; attemperator spray control valve VTC-8 replace (capital).

Fuel oil system – various fuel oil relief (section VIII) valves replace; igniter assemblies (6) replace (capital); W51/W52 secondary fuel oil pump breakers retrofitted w/vacuum breakers (capital); fuel oil supply control valve VFC-5 replace (capital); fuel oil return control valve VFC-7 replace (capital).

Generator - H2 Purity Meter (capital); 18 generator current transformers replaced (capital); stator core rewind and testing (includes new stator bars and coils w/type F insulation) (capital); generator protection relay (287 & 240) upgrade to microprocessor unit (capital); generator grounding brush install (capital); flux probe port install (capital); stator 100% re-wedge; H2 piping kerotest valves replace; stator RTD terminal block replace; NDT rotor retaining rings; generator rotor bore; rotor NDT tests/inspection; rotor radial leads test/repair; voltage regulator/rheostat service; hoses to H2 coolers (both coolers) replace; eddy current NDT H2 coolers; H2 Kerotest (< 1") valves replace; generator relay trip test.

Instrument air system – various relief valves (section VIII) replace; reducing valves replace; air filters replace.

Service air system – various relief valves (section VIII) replace; service air compressor motor stator/rotor recondition.

Turbine – HP/LP turbine overhaul; service speed load changer motor; HP snout rings replace; HP bore NDT; HP curtis stage R-1/R-2 rotating blades replace (capital); governor valve seats (6 ea) cracks weld repairs; throttle valves NDT/service; HP rotor blades re-contour/repair; HP blade rings repair; lower nozzle chamber NDT; HP rotor slow speed balance; LP bore; LP inner cylinder bolt hole crack weld repair; turbine bearings #1, #2, #5, #6 re-babbit, LP L-1 (2 rows) replace (capital), LP L-2 (2 rows) erosion shields replace (capital); LP slow speed balance; LP inner cylinder trunions weld

build up; extraction to feed water heater bleeder trip valves service; various cooperheat pads/ropes replace.

Water system – auxiliary cooling water pump 51 motor stator/rotor recondition; W51 screen wash pump motor stator/rotor recondition; W51 boiler wash pump motor stator/rotor recondition; W51 service water pump motor rewind.

# H8 scheduled unit overhaul (P0000523). Breaker open 04-12-03. Breaker close 12/2/03. 33.4 wks. Overhaul extended due to extensive turbine repairs and need for generator rewind.

**Boiler** - BRULs/HieL; boiler tubes wash; boiler electric warming (incomplete,-capital); boiler safety valves (Sect I) service/hydroset; boiler thermocouples replace w/upgraded recorder (capital); major 100% WW tubes replacement to rear and front WW headers; casing/refractory repairs; observation ports clean/service; boiler inspection; atmospheric blow down tank service.

**Boiler draft system** – APH tubes wash; opacity monitor service and replace CRU unit; FD fan clean/service and vanes ball pins replace; H81/H82 ID fan clean/service and vanes ball pins replace; H82 ID Fan rotor reconditioned; power operators service; various isolation and drain valves replace or repair; air pre-heater drives service; manual dampers service.

Circulating water system – H81 condenser tubes (100%) eddy current NDT; H82 condenser tubes (100%) eddy current NDT.

Condensate system – various relief valves (section VIII) replace; FWH 81/82 tubes eddy

control valves VFC-8, VFC-9, VFC-10 internals replace; BFP 81, 82, 83 disch valves repair; economizer check valve repair

Fuel oil system- H81/H82 SFOP 480V vacuum breaker upgrade; various relief valves (section VIII) replace; fuel oil supply control valve VFC-6 internals replace; fuel oil to burner control valve VPC-26 internals replace.

**Steam** – Aux steam regulator control valves VPC-5 and VPC-6 internals replace; atomizing steam to burner control valve internals replace.

Generator- 18 generator current transformers replaced (capital); generator protection relay (287 & 259) upgrade to microprocessor unit (capital); grounding brush install (capital); flux probe install (capital); generator rotor bore; generator rotor inspection/NDT

### K3 scheduled unit outage. Breaker open 8-2-03. Breaker closed 8-29-03. 4 wks.

**Boiler** – Boiler tubes wash; boiler inspection; refractory/casing repairs; section I safety valve RV-49 overhaul; replaced all 76 SSH DMWs; RH NCR discrepancy inspection; Cold/Pressurized lines repairs; economizer inlet header drain root and stop valve replacement; main steam line drain stop valve (S6) replacement; PSH in header drain stop valve (S1) replacement.

**Boiler draft system –** APH baskets wash; APH Cold Intermediate baskets replacement; K32 APH bearing oil replacement; various hopper knife valve replacements; various power operators service; various expansion joint repairs; FD Fan high speed bearing oil replace.

Circulating water system – Condenser tube scraping; CWP 31 discharge expansion joint replacement; CW inlet pipe cross braces installed; condenser cathodics repairs; CWP 31 motor rotor/stator recondition.

Condensate system – Condensate Pump 31 motor rewind; condensate pump 31 & 32 throttle bushing repairs; condensate pump 31 & 32 suction expansion joints replacement.

Electrical – main and auxiliary transformers service.

Feed water system – SH & RH Attemperation Control Valves replacement (capital); FW Regulator VLC-23 internals replace; FW Bypass VFC-10 internals replace; BFP 32 Recirc VFC-9 valve replace with upstream isolation valve; BFW piping hangers; FWH drain orifices RO-38 & RO-39 replacement; RH Attemperation Block VTC-5 replace; BFP 31 motor rotor/stator recondition; BFP 32 coupling replacement, BFP 32 motor epoxy coating repair.

**Fuel oil system** – Burner hoses replacement; burner alignment inspection; PFOP 31 motor rotor/stator recondition.

**Generator** – Generator Relay Trip Test; generator ground brush VCM meter calibration/re-ranging; generator ground brush replacement.

Instrument air system – K3 Instrument Air Compressor motor rotor/stator recondition.

Steam system – Aux Steam RV-25 repair; MS MOV-1 packing replacement.

Turbine – MOV-10 valve replacement with upstream/downstream stop valve replacements; LP turbine makai crossover bellows PT; EHC filters replacement;

Emergency Trigger repair; Low Bearing Pressure Trip repair; ETD replacement; Intercept valve servos replacement (4 total); actual overspeed trip test.

Water system – Auxiliary Cooling Water Pump 31 motor recable.

# W7 scheduled unit overhaul (P0000522). Breaker open 9-10-03. Breaker closed 11-03-03. 8.0 wks.

**Boiler-** BRULs/HiEL, boiler wash, boiler inspection, ww tube samples removed for deposit analysis, refractory and casing repairs, VPC-20 IK Sootblower Control Valve replaced internals, clean/service observation ports, serviced/hydroset Section 1 Safety Valves, sevice O2 analyzer,

**Boiler draft system-** APH wash and basket rack replacement, serviced power operators, FDF fan service, FDF vane clean/service, Vane ball pins replaced, manual dampers serviced, gas recirc fan service, removed and replaced seal air piping (capital),

Circulating water system- W71 & W72 condenser tubes 100% eddy current, tunnel cleaning, W71 &W72 CWP service,

Condensate system- VLC- 11 FWH #3 normal drain control valve replace internals, replace FWH drain/vent orifices, hog jet & air ejector service,

Control room equipment- DCS cabinet muffin fans replaced, UPS batteries replaced, various metering instrumentation calibrated,

Electrical- Main/Aux Transformer service, service various line starters/switchgear, lighting panel service,

Feedwater system- Cycle Chemistry Instrumentation (capital), BFP Recirculating Control Valve Upgrade (capital), VLC-23 Main FW Reg internals replace, SH & RH Attemperator Spray Control Valve replacements (capital), BFP isolation valve replace,

Fuel oil system- VPC-7 FO supply control valve internals replace, VTC-4 FO temp control valve internals replaced, VPC-4 FO spill over trip control valve internals replace, burner fuel oil hoses replace, ignitor service, W72 SFOP motor recondition,

Generator- H2 coolers NDT/eddy current, 100% stator rewedge, rotor NDT/inspect, voltage regulator/rheostat service, generator relay trip test, grounding brush replace,

Turbine- Throttle valve (2) service, Governors service, RH Intercerpt valve service, lube oil tank / bowser service, turbine stub shaft alignment,

Water system- W7 Chiller NDT/Eddy Current, Aux Cooling Water Boost Pump replace (capital), W71 SSWP motor reconditioned.

# K4 scheduled unit overhaul (P00000655). Breaker open 11-25-03. Breaker closed 1-26-04. 8.7 wks.

**Boiler** – BRULs/HiEL boiler inspection, boiler tubes wash; two ww tube sample removed for deposit analysis, two SSH tube samples removed; replaced 5 bowed WW tubes; replaced SSH DMW and thermocouples; replaced SH and RH thermocouples; refractory/casing repairs; section I safety valves internal hydroset all, repaired RV-52; observation ports replaced 8 and cleaned/serviced the rest, O2 analyzer (capital) replaced, replace sootblower CV internals in 4VPC-20 and 4VPC-21.

**Boiler draft system** – APH baskets wash; replaced the entire cold in baskets and turned over the intermediate cold in baskets; various power operators service; FDF high speed and LS motor stator/rotor recondition; FDF vanes clean/service, vane ball pins replaced with original type; manual dampers service; various expansion joint replacement and

Electrical – main and auxiliary transformers service; main/auxiliary transformers fire sprinkler test; service various line starters, switchgear, lighting panels, transformers; installed transformer annunnciator;

Feed water system – cycle chemistry instrumentation (capital); K41/K42 BFP lube oil reservoirs clean/service; K41/K42 boiler feed pump recirculation valves (4VFC-8 & 4VFC-9) replaced with reconditioned valves; FWH 44 tubes eddy current NDT; FWH 45 video probed 25% of tubes; FW main control valve 4VLC-23 internals replace; FW bypass control valve 4VFC-10 internals replace; K41 boiler feed pump volute replaced and motor stator/rotor serviced; K42 BFP bearing leak repaired; SH and RH attemperation block valve 4VTC-9 and 4VTC-5 replaced (capital); superheat and reheat attemperation spray valves 4VTC-8 and 4VTC-10 replaced (capital); BFP K41/K42 discharge piping nozzle welds NDT.

Fuel oil system – Combustion control valve 4VPC-7 internals replace; burner auxiliary steam pressure control valve 4VPC-15 replaced entire valve and actuator; burner front fuel oil hoses replace; ignitors service; K41 secondary fuel oil pump mechanical seal replaced: aux steam to reboiler control valve 4VPC-3 internals replace.

Generator – IRIS NDT H2 coolers (100%); Rewind generator rotor (capital); generator

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# K5 Schedule Unit Overhaul (P0000519). Breaker open 1-25-04. Breaker closed 5-14-04. 15.6 weeks. Overhaul extended due to extensive boiler controls upgrade repairs.

**Boiler** – BRULs/HiEL major work; boiler inspection; replaced reheater tube elements and respective thermocouples (capital), major refractory, casing & insulation repairs; replaced valve internals for IK sootblower control valve VPC-20 & APH sootblower control valve VPC-21; chemical cleaning performed on boiler tubes using non-firing method (2 step CuSol process); refurbished main steam stop MOV-1 valve internals (new valve stem); major hopper casing repairs; repaired several burner front gas leaks; serviced Sect 1 Safeties RV-49, 50, 52, 55, 56 & 57, repaired RV-53 (ERV).

**Boiler draft system** – cleaned AH baskets and replaced seals; stack repairs; power operator upgrades & service; both FDF's serviced, vane ball bearings replaced & rotor bearings serviced; both FDF motors cleaned & serviced; manual dampers serviced; serviced opacity monitor; installed upgraded C02 analyzer (capital).

Circulating water system – tunnel cleaning (hydroblasting); both CWP motors reconditioned; K51 & K52 condenser tubes scraper cleaned and 100% ECT; serviced condenser current cathodic system and replaced sacrificial anodes; major spall repairs to circ water pit.

Condensate water system – FWH's 51, 52, 53 & 54 tubes 100% cleaned (hydroblasted) & ECT; air ejector tubes 100% cleaned (hydroblasted) & ECT; K51 Condensate pump motor reconditioned, K52 motor serviced; converted valve internals for Sect 8 RV-18 to gpm (reboiler condensate tank); replaced valve internals for VLC-11 (54 FWH norm lvl drn), VLC-18 (54 FWH hi lvl dump) and VFC-20 (52 condensate pump disch); VLC-10 (cond'te hi lvl reject); K54 HDP motor reconditioned.

Control room equipment – boiler controls upgrade (capital) converting all vital pneumatic boiler controls to a microprocessor based distributed control system (DCS) with CRT operator interface stations (OIS); data acquisition & monitoring (capital); AEH limit switch upgrade for turbine valves (capital); calibrated various meters & instruments.

Electrical systems – 480V switchgear & breaker trips upgrade (capital); service various line starters, switchgears lighting panels & transformers; main & auxiliary transformer NDT/dobble tested/annunciator installation; main & aux transformer fire sprinkler tested.

Feedwater systems – K52 Boiler feed pump motor replaced (1429 capital); both BFP recirculating feed water line modifications (capital); SH attemperator spray and block control valve system replacement (capital); RH attemperator spray and block control valve system replacement (capital); boiler water CCI (capital) with new instrument shed; boiler feed pump automated testing (capital); replaced valve internals for Sect 8 RV-44 & 45 (K55 & 56 FWH); replaced valve internals for VFC-8 & VFC-9 (K51 & 52 BFP recirc control valves); replaced valve internals for VLC-23 (FW regulator), VFC-10 (FW regulator bypass), VLC-2 (56 FWH hi/low dump); major insulation repairs.

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Fuel oil systems – converted valve internals for Sect 8 RV-12 & 13 to gpm (SFO 51 & 52 Shell); replaced various steam tracer systems steam traps; replaced valve internals to VTC-4 (steam to secondary FOH), VPC-7 (combustion control); replaced all ignitor solenoids; K51 & K52 PFOP motors serviced.

Generator – NDT testing: EL-Cid, DC insulation resistance & leakage test, HiPot, meggar thrubolts & RTDs, A/C pole drop, impedance; NDT retaining rings; re-wedged; gen core tightening (OMM kit); re-torqued belly bands; generator flux probe installed (capital); installed new hydrogen seals; generator rotor bore-sonics tested; serviced purity meter; calibrated voltage regulator; serviced exciter; replaced various H2 valves; replaced valve internals to VTC-6 (cooling water to H2 cooler), seal oil regulator & seal oil backup regulator; inspected generator C/T's, tested/serviced generator protection relays; cleaned (hydroblasted) H2 coolers, 100% tubes ECT.

**Turbine** – HP turbine overhaul – replaced curtis row (72 wide vane blades), replaced stage 14 rotating and stator blades, rebuilt & carbide coated all nozzle blocks, replaced 84 oil seal halves, machined mail oil pump upper & lower casing areas for standard fit. LP turbine overhaul – removed indication on L-4 stage, replaced blade steam shields, realign & stake various blades.

HP/IP & LP rotor bore sonics; NDE/NDT; replaced all HP/IP radial sealing strips; all 6 bearings rebabbitted; replaced fixed bell seals with 100% expandable metal circumferential seal (floating bell seals); extensive machining to remove cylinder high stress flow guides; EHC filtering system modifications, accumulators serviced; EHC system flushed; both lube oil coolers cleaned (hydroblasted), all tubes 100% ECT; cleaned, inspected lube oil reservoir & replaced bowser filters; serviced all 5 bleed trip valves to FWH's; installed wire mesh strainers in RH intercept valves to protect turbine upon startup due to extensive RH element tubes replacement (capital); installed 4 fire protection sprinkler heads above turbine lube oil tank; major insulation repairs.

Water system – replaced Sect 8 RV-47 & 76 (K61 Chiller); cleaned & hydroblasted 100% K61 & K51 chiller tubes; eddy current NDT 100% tubes K61 chiller; serviced central well sluice gate valves; K52 SSWP motor reconditioned; replaced VFC-3 & VFC-4 (K51 & 52 Travel screen wash).

# W3 Schedule Unit Overhaul (P0000249). Breaker open 6-4-04. Breaker closed 10-9-04. 18.2 weeks. Overhaul extended due to turbine repairs.

Boiler – BRULs/HiEL; boiler inspection; 95% asbestos abatement on boiler casing; refractory and casing repairs; refurbished all sootblower assemblies; installed new ERV controller and valve (capital); installed new propane igniter system (capital); installed new drum level indicator (capital); replaced valve internals for the sootblower control valve VPC-20; chemical clean performed using non-firing method (2 step CuSol process; service O2 analyzer; main steam stop valve refurbished internals; hydroblasted front WW tubes 20ft up from mud drum; replaced 60 sidewall tubes

**Boiler draft system** – replaced air preheater tubes (capital); refurbished sootblower assemblies; power operator upgrade; FD/ID fan vanes clean/service; LS/HS ID fan motors recondition; LS FD fan motor recondition; replaced HS FD fan motor; opacity monitor upgrade (capital); manual damper service

Circulating water system – W31/W32 condenser tube (100%) eddy current NDT; replaced condenser waterboxes; replaced condenser cathodic system; circ water temp monitoring (capital)

Condensate water system – FWH 34, 32, 31, tube eddy current NDT; air ejector eddy current NDT and tube replacement (3); various FWH relief valves (sec. VIII) replaced

Control room equipment – Data acquisition and monitoring (capital); operator console upgrade (capital); installed new remote terminal cabinet in the DCS room; various metering instrumentation calibrate

Electrical systems – service various line starters, switchgear, lighting panels, transformers; main transformer replacements (3 ea) (capital); auxiliary transformer NDT/dobble; main/aux transformer fire sprinkler test

Feedwater system – FWH 35 and instrumentation replace (capital); BFP automated testing (capital); various FWH relief valves (section VIII) replace; main feedwater regulating control valve internal reconditioned; feedwater bypass control valve internals replaced; cross attemperation upgrade (capital)

Fuel oil system – fuel oil supply regulating valve VFC-06 internals replaced; propane igniter upgrade (capital); cleaned and inspected lube oil reservoir and storage tank

Generator – 12 generator current transformers replaced (capital); replaced generator secondary wiring; 2 generator bushing replaced; generator grounding brush install (capital); flux probe install (capital); generator testing EL-Cid and DC leakage; generator rewedge; voltage regulator/rheostat service; generator protection relay (capital)

Turbine – HP/LP turbine overhaul; service speed load changer motor; turbine HP casing repairs; Curtis blade replacement; stellite shield replacement on turbine blading; right throttle valve disc recondition; turbine warming monitoring; HP/LP bore inspection NDT; extraction to feedwater heater bleeder trip valves service

Water system – auxiliary cooling water pump 31 motor recondition; distilled water pump motor recondition; heater drip pump 32 motor recondition

# W8 scheduled unit overhaul (P0000521). Breaker open 8-21-04. Breaker closed 11-2-04. 10.4 wks.

Boiler – BRULs/HiEL boiler inspection, boiler tubes wash; two WW tube sample removed for deposit analysis, two SSH tube samples removed; Clad welded the impinged WW tubes Waikiki-Makai & Ewa-Mauka corners; replaced SSH DMW; replaced SH and RH thermocouples (18 total); refractory/casing repairs; hydroset all section I safety valves, repaired RV-49, RV-50 & RV-52; replaced 5 observation ports and cleaned/serviced the rest, O2 analyzer port replaced for the new style (larger) probe, upgraded IK (all electric drive) and APH (stationary element) sootblower systems and controls, replaced two IK lances, installed new sootblower CV 8VPC-27, removed 82 APH block and two-way temperature CV (thermostatic drain), modified the APH sootblower piping. Repaired the following valves: Main Steam Stop, Continuous blowdown, both Main Steam Stop Bypass (upstream and downstream) and Steam to Sootblower Reg Stop; Replaced the following valves: SSH outlet drain stop valve and the boiler drum sample; installed a new isolation valve on the economizer recirc line (B5 floor)

Boiler draft system – APH baskets wash; Inspected cold end and hot end baskets and reinstalled. Replaced diaphragms on the cold end with 3/8" steel plate and the basket racks and upper Circ seal support angle were replaced. FDF high speed and LS motor stator/rotor recondition; FDF vanes clean/service, vane ball pins replaced with original type; manual dampers service; various expansion joint replacement and repairs (Downcomers, APH, ); extensive repairs on insulation ducts and expansion joints; gas recirculation fan service; draft lines unplug

Circulating water system – W81 & W82 condenser tubes (100%) eddy current NDT; Cleaned Circ Water Inlet tunnels

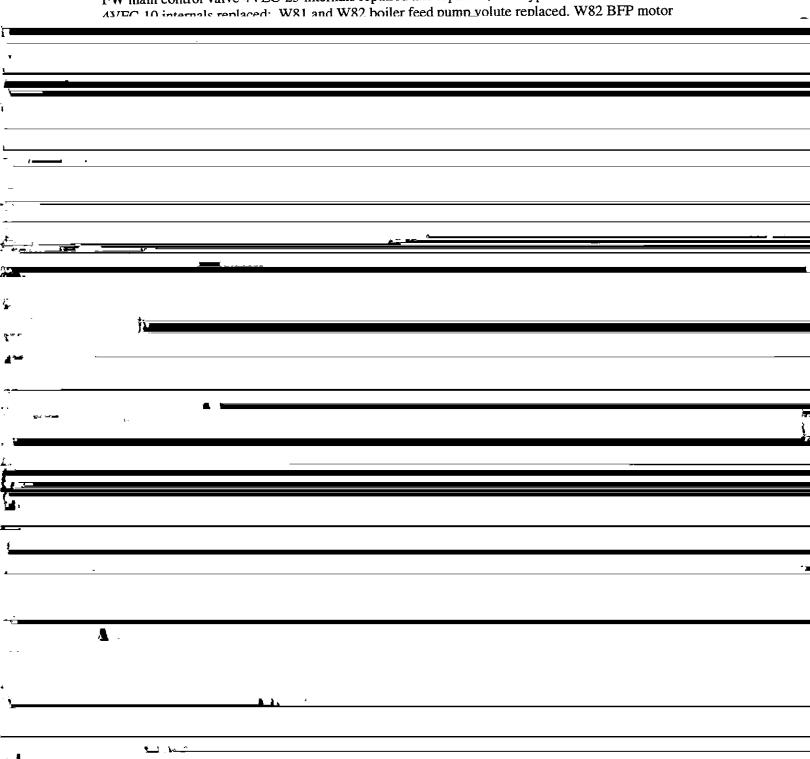
Condensate system - FWH #81 & #83 ECT test (100%); air ejector tubes ECT; air ejector service; #82 Condensate Pump motor recondition and rotor balance; replaced internals normal level control valve 8VLC-11; repaired #83 FWH bleed valve and 81 FWH by-pass valves

**Control room equipment** – Various metering instrumentation calibrated and replaced the SH/RH recorder

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Electrical – Main and auxiliary transformers service; main/auxiliary transformers fire sprinkler test; service various line starters, switchgear, lighting panels, transformers; installed transformer annunciator; replaced the aux transformer cables (9 total)

Feed water system – cycle chemistry instrumentation (capital); W81/W82 BFP lube oil reservoirs clean/service; W81/W82 boiler feed pump recirculation valves (8VFC-8 & 8VFC-9) replaced valve internals and installed a new block valve on each line; FWH 84 & 85 tubes ECT; FW main control valve 4VLC-23 internals repaired and replaced; FW bypass control valve



Water system - #81 chiller tubes eddy current NDT: #81 service station water pump motor

stator/rotor recondition

# W9 Forced Outage Compressor Blade Damage, Started Planned Unit Overhaul (P0000937) Breaker open 10-27-04. Overhaul extends into 2005.

Air Inlet System – Removed all corroded mild steel material, sand blast and sealed the entire inlet ducting. Fabricated and installed 64 Stainless steel silencer panels, replaced all ducting side wall insulation and installed Stainless Steel perforated sheets.

#### Accessory Compartment - Major inspection and repair:

Fuel system-Rebuild fuel pumps, fuel nozzles, installed new fuel lines, filters, check valves. Hydraulic system – Inspect main and auxiliary components, repaired relief /check valves and installed new main Hydraulic pump, filters, accumulator, and hoses where needed, Cooling System – Cleaned, pressure test all four Radiators, Atomizing Air pre-cooler, Lube oil cooler, inspect and repair pump, control / check valves; install new radiator fan motor. Lube oil System – Drained and cleaned oil sump; inspect and repair pumps, valves.

Compressor/Turbine – Removed all stationary and rotational blades / buckets; cleaned and preformed NDT / Forensic testing as required, minor casing repairs as needed; replaced compressor blades; inspect and repair cooling air system, valves and drains. Replace all bolting hardware components and thermocouples.

**Combustor** – Modified casing and installed new thermocouples, cross fire tubes; rebuild all igniters, atomizing air nozzles, can liners, and transition pieces.

Exhaust Duct- Removed, and install new exhaust duct components.

Control equipment – Installed new Bentley 3500 machinery protection system, including vibration and temperature transducer up grade; rebuild inlet guide vane actuator.

Electrical systems – Service all major motors, various line starters, switchgear, lighting panels, inspect and test main, start up, and auxiliary transformers.

Generator – Flux probe installed; generator testing EL-Cid and DC leakage; generator re-wedge; voltage regulator/rheostat service; generator protection relay. inspect / test rotor, retaining rings.

Repaired and painted structural framing, turbine/ generator housing compartments.